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Sinclair (J.)

REPORT

OF THE

COMMITTEE

OF

The Board of Agriculture,

CONCERNING

THE CULTURE AND USE OF

POTATOES.

Entered at Stationers Hall.

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REPORT

OF THE

COMMITTEE

OF

THE BOARD OF AGRICULTURE,

APPOINTED TO

EXTRACT INFORMATION FROM THE COUNTY REPORTS

AND OTHER AUTHORITIES,

CONCERNING

THE CULTURE AND USE OF POTATOES.

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Board of Agriculture

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FOR GEORGE NICOL, BOOKSELLER TO HIS MAJESTY
AND THE BOARD OF AGRICULTURE;
AND SOLD BY MESS. ROBINSON, PATERNOSTER-ROW; J. SEWELL, CORNHILL;
AND CADELL AND DAVIES, STRAND;
WILLIAM CREECH, EDINBURGH; AND JOHN ARCHER, DUBLIN.

1795.

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INTRODUCTION.

EARLY in the Spring of 1795, the Board of Agriculture took into its conſideration the dearneſs of proviſions; and, among the various ideas which were with the moſt patriotic views expreſſed on that occaſion, none ſeemed to merit ſo immediate an attention, as to encourage, by ſuch means as were in the power of the Board, a more extenſive Cultivation of Potatoes; the early ſorts of which root promiſing a remedy to a deficiency of corn late in the ſummer; and other ſorts tending to add greatly to the national ſtock of food, ſhould the ſcarcity continue beyond the harveſt. The Board was particularly called to this object of their attention, in a ſpeech from the Preſident, at an extraordinary meeting, held on the 10th of February: an Extract of which, from the minutes, is here inſerted, as explaining the origin of the following publication.

The Preſident ſtated to the Board, "That he had requeſted "the attendance of as many Members as poſſible, for the "purpoſe of ſubmitting to their conſideration what had occurred to him on the apprehended ſcarcity of grain: That "from any information which either he or the Secretary of "the Board had been able to collect, it appeared, that though "the crop had failed in ſome parts of the kingdom, or rather "did not yield what was expected from the very promiſing "appearance on the ground, yet that in other diſtricts it had "been nearly as abundant as uſual: That, on the whole, "there was no reaſon to apprehend either famine or even "great ſcarcity; at the ſame time, as no ſurplus ſtock of grain "was likely to remain, precautions were neceſſary againſt "the riſk either of a late harveſt, or of any accident happening to the crops now on the ground: That the moſt "effectual remedy which had occurred to him was, to encourage, as much as poſſible, an increaſed culture of potatoes, "which could be cultivated almoſt in any ground, and might "be planted where wheat could not be raiſed at all; or at "any rate was not likely to be ſown during the preſent ſeaſon: That if the next crop were deficient, potatoes would be a "certain reſource as food for man; or if the crop were abun-

" dant, they might be converted to the purpoſe of fattening " ſtock; a matter which alſo required the particular attention " of the Board, from the high price of meat at preſent, and " the little proſpect there is of a fall: and that he flattered him" ſelf the Board had ſo far eſtabliſhed its character in the public " eſtimation, that it might ſafely rely on a very general ſup" port in carrying any meaſure into full effect, of ſuch eſſen" tial conſequence to the public intereſt. On the whole, he " begged leave to ſubmit the following Reſolutions to the " Board:

" RESOLVED,

" That an increaſed cultivation of that valuable root, the " Potatoe, appears to the Board, to be one of the moſt im" portant objects, that can poſſibly be recommended to the " attention of Britiſh farmers.

" That much information reſpecting the cultivation and " uſe of that valuable root, having been communicated to the " Board, a Committee be appointed to draw up a Report upon " the ſubject; and that the ſame, when approved of by the " Board, ſhall be printed and circulated for the public uſe.

" That it be recommended to the Members of the Board, " to promote in the ſeveral diſtricts with which they are " connected, the culture of potatoes as much as poſſible."

Theſe Reſolutions being adopted by the Board, on the 13th of February, gave riſe to the following Report.

It is only neceſſary to add, That any farther communications, more eſpecially the reſult of any experiments which may have been tried in regard to any particular connected with either the cultivation or the uſe of this valuable root, will be extremely acceptable to the Board of Agriculture. Letters on that, or any other ſubject connected with the agricultural ſtate and improvement of the country, may be addreſſed to *Sir John Sinclair, Bart. M. P. London.*

WHITEHALL,
15th June, 1795.

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CHAP. I.

OF THE SORT OF POTATOE.

Authorities extracted from the County Reports.

IN Lancaſhire, the Ox Noble and Cluſter ſorts are planted for cattle. The Old Winter Red is peculiarly good in the ſpring, when other kinds have loſt their flavour; and it has never been known to curl. *(a)*

In the North Riding of York, Ox Noble, Champion, and Surinam, are cultivated; but chiefly the Kidney. *(b)*

In the Iſle of Man, the ſorts moſt in uſe are, the Kidney: good, but not prolific, nor keep well—the White and Apple ſorts, better than moſt for the firſt part of the ſeaſon—the Pink Eyes and Copperplates: hardy, ſtrong, and admit of coarſe management—the Blacks, a late ſort, keep well till Auguſt. *(c)*

In Mid Lothian, ſeed is ſometimes raiſed from the apple: requires two years; the firſt only as large as nuts: many ſorts from the ſame apple: more prolific. The Kidney potatoes the beſt; large produce on very rich ſoils; but will hardly grow on poor land. Curl avoided by changing ſeed from other counties. *(d)*

In Weſt Lothian the purple ſtreaked kind affords the largeſt produce. Raiſing them from the ſtem is the moſt eaſy and certain way to come at the ſame ſpecies. The Stem potatoes are ſome ſeaſons found in plenty upon the joints of the ſtalk; are in perfection after the ſecond year's planting: raiſing from ſeed more tedious, the kinds numerous and uncertain. The white Surinam preferred to the red, which is apt to hove cattle. *(e)*

In Eaſt Lothian, the Blackamoors and Killamancas are at preſent the moſt productive *(f)*. Renewing the ſeed by raiſing it from the apple, has always proved unſucceſsful. *(g)*

(a) Lancaſter, p. 30.
(b) North Riding, p. 43.
(c) Iſle of Man, p. 35.
(d) M Lothian, p. 68.
(e) W. Lothian, p. 26.
(f) Eaſt Lothian, p. 80.
(g) Eaſt Lothian, p. 81.

In Eaſt Lothian, the Surinam potatoe yields 30 per cent. more than any other kind. (h)

In Selkirkſhire, the Kidney and Round White are eſteemed the beſt, being dry or mealy; and yield the greateſt produce. (i)

In Roxburghſhire, found good to change ſeed from a wet cold ſoil to a ſharp one; and from this county to Edinburgh, where the ſoil is ſtiffer and wetter. (k)

In Ayrſhire, the Round Red and the Round White, of a dry nature, are preferred, both for taſte and produce. (l)

Other Authorities on the ſame Subject, from Manuſcript Obſervations tranſmitted to the Board, or various Agricultural Publications.

At Ilford, in 1784, the Red Noſe Kidney laid aſide, becauſe ſure to be curled. The Champion, generally preferred, does not curl. (m)

Mr. Turner, in Suffolk, part of a field Red Noſed Kidney, and part Ayleſbury White; the former all curled; the latter healthy. (n)

Mr. Lord, in Suffolk, White and Red Kidney: the former, every plant curled; the latter, not one. Alſo Red Noſed Kidney and Pheaſant Eye; the former all curled, the latter not one. (o)

Mr. Bucke, of Suffolk, planted the Dutch upright ſpecies and the Pink Noſe. The latter curled; the former did not. (p)

Mr. Pitt, of Staffordſhire, (1.) Champions early; never curl; but not a great produce. (2.) Ayleſbury Whites; large, and great produce. (3.) Ox-Noble; great crop, very large, but apt to be hollow: ſell readily. Surinam greateſt product of all: good for cattle. (q)

Mr. Billingſley, of Somerſetſhire, Surinam, Ox Noble, and Horſe Legs, not ſo nutritious as other ſorts. (r)

Mr. Woolward, in Suffolk, thinks the Goldfinder, which is yellow within, the beſt ſort. (s)

Mr. Young compared the Cluſter, Red Noſed Kidney, and Golden Tags. Produce per acre under the ſame management in the drill method,

Cluſter	360 buſhels
Kidney	144
Tags	207 (t)

In Edinburghſhire, the Red Neb (ſo called from ſmall red ſpots on the ſmalleſt end) the earlieſt; ready the laſt week in July. (u)

(h) Eaſt Lothian, p. 82.
(i) Selkirk, 30.
(k) P. 33.
(l) Ayrſhire, 26.
(m) Annals, vol. 2. p. 98.
(n) Annals, vol. 2. p. 150.
(o) Ibid. v. 1. p. 133.
(p) Vol. 5. p. 251.
(q) Ibid. v. 7. p. 40.
(r) Vol. 21. p. 4.
(s) Vol. 23. p. 31.
(t) Society of Arts Tranſactions, vol. 3. p. 34.
(u) Wight, v. 4. p. 446.

Sir Thomas Beevor compared the following ſorts: the four firſt, in a garden border where a row of apple-trees had grown, and taken up a month before; the three laſt, in garden-ground that had been cropped in the common manner.

	Wt. of Seed. lb.	Wt. of Seed. oz.	Quantity of Land planted.	Wt. of Prod. lb.	Wt. of Prod. oz.	Buſhels per acre.
Incomparable, a ſeedling	4	9	6 tenths of a rod	13	0	692
Dennes Hill, ditto	3	1	8 ditto	16	10	668
Bayley's ditto	3	1	5 ditto	8	6	539
Manley White	4	12	3 ditto	6	4	670
Kentiſh Seedling	2	10	4 ditto	16	11	1342
Champion	3	6	5 ditto	11	1	708
Ox Noble (u)	3	11	4 ditto	14	0	1140

Mr. Whyn Baker, in Ireland, compared various ſorts as under:

	lb.	oz.
Commonwiſe produced	21	6
Apple	20	2
Red French	15	12
Munſter White	16	0
Crones	16	6
Spaniſh	15	10 (v)

And repeating the experiment the year following, the reſult was,

Sort.	Barrels per acre.
Black	111
Quakerwiſe	108
Red French	88
White ditto	85
Commonwiſe	103
Apple	76
Engliſh White	83
White Munſter	79
Spaniſh	70
Crones	60 (w)

The kinds of potatoe, ſays Mr. Haſſal of Narbeth, which I have found moſt uſeful for family conſumption, are the Apple and the White Kidney; cultivated with great ſucceſs in the counties of Wexford and Wicklow, in

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(u) Bath Society, vol. 4. p. 304.

(v) Experiments reported to the Dublin Society 1771, p. 100. (w) Ibid. 1772, p. 101.

Ireland. Theſe ſorts produce great returns, are firm and mealy, pleaſant to the palate, and do not acquire that diſagreeable taſte at the approach of ſummer, to which many other ſorts are liable. (x)

Mr. Townly, of Belfield, names the Early Red and White, Dwarfs. The flat White Kidney, by ſome called the True Spaniſh, for ſummer uſe; alſo, for winter uſe, the White and Red Ruſſet, the Golden Tag, the Iriſh Dun, and the Smooth Winter White. For black earth the Iriſh Blue, and the Old Engliſh Red, which are hardy, with ſtrong coats. The White Lancaſhire grows very large, and yields plentifully. (y)

The Royal, or Cumberland Early, is of a large ſize, very prolific, of an excellent flavour, and ripens early enough to admit of the ground being employed either in raiſing another crop of the ſame potatoes, or a crop of white peaſe, turnips, cabbages, or green kail. Theſe circumſtances render it a valuable acquiſition; and there is little doubt, that in a ſhort time it will go a great way to ſupplant every other kind. What gives this potatoe a decided preference is, that it is ready at a time when the price of grain and other neceſſaries of life are at the higheſt; that is, between the old and the new crop. (z)

Mr. Parkinſon, of Doncaſter, compared ſeveral ſorts.

The Black produced, per acre,	1000 pecks.
The White	800
Kidneys	500
Champion	1000
Ox Noble	1200 (a)

The Black potatoe affords more ſtarch than the White, and is of a greater ſpecific gravity. (b)

OBSERVATION.

Such are the authorities concerning the ſort of potatoe which have occurred, whether in the county reports, or in various other communications tranſmitted to the Board, or in theſe authors who appear to have treated the ſubject the more immediately, either from actual experiment, or the obſervations of practical men. Great difficulties will neceſſarily attend the enquiry from the uncertainty of what the ſorts are which paſs with different perſons under the ſame denomination; but there does not appear in the preſent ſtate of our knowledge of this root, any means of removing this obſcurity. In future, however, it will be highly deſerving the attention of practical men to deſcribe particularly the ſorts of their potatoes, relative to root, branch, leaf, bloſſom, or any other circumſtance that ſhall promiſe a more accurate diſcrimination. And another object deſerving of attention is an experimental enquiry, which does not ſeem hitherto to have been made, How far any ſorts of this root may be more peculiarly adapted to certain ſoils than other ſorts (*c*)? It is not the purpoſe of the Board to give any opinion on this ſubject; they wiſh only to report facts; and where theſe appear to be inſufficient, to endeavour to excite the attention of thoſe practical men whoſe ſituation enables them to try the neceſſary experiments. It may probably be obſerved, that ſome of the contradictions that will be found in certain authorities, may, from this circumſtance, be more apparent than real.

(x) MS. Papers of the Board. (y) Georgical Eſſays, vol. 4. p. 44.

(z) MS. by Mr. Wm. Somerville. (a) MS. Papers of the Board.

(b) Mr. A. H. Hemphill, MS. Papers of the Board.

(*c*) It is ſtated by Mr. M^{c}Culloch, miniſter of Bothwell, in Clydeſdale, that a black or blackiſh red potatoe they have lately got in that part of Scotland, ſtands a clayey ſoil better than any other; and in the ſpring becomes dry and mealy. — *MS. Papers of the Board.*

CHAP. II.

OF THE VARIOUS PREPARATIONS FOR THE CULTURE OF POTATOES.

UNDER this head it is neceſſary to notice,

1. Old graſs
2. Mountain moor and bog
3. Woodland
4. Young plantations
5. With turnips
6. In corners of fields
7. The ſoil
8. Manuring
9. Paring and burning
10. Rotations.

SECTION I.

OF OLD GRASS AS A PREPARATION FOR POTATOES.

Authorities from the County Reports.

IN Lancaſhire, ſaid in the Report to ſtand unrivalled in the culture of potatoes, a ſward, or freſh lay, is reckoned moſt deſirable. *(a)*

Colonel Mordaunt, of Lancaſhire, raiſed the Cluſter Potatoe on a layer; and the crop, when ploughed up, was viewed by intelligent farmers, who agreed that they never ſaw ſo abundant a produce. No dung applied. *(b)*

Mr. Bower, of Nottinghamſhire, ploughs a ſwarth with a French plough *(c)*, and plants every third furrow.

Old lay, at Werton, near Frodſham, in Cheſhire, is frequently let to the labouring poor at 2s. the rood, or 16l. an acre, Cheſhire meaſure; and no kind of manure allowed. *(d)*

Other Authorities.

Mr. Kirby, in Suffolk, gained 400 buſhels an acre, on an old layer without manure. *(e)*

At Knutsford, in Cheſhire, old graſs dug, produce 500 buſhels per acre. *(f)*

(a) Lancaſter, p. 28. *(b)* Lancaſter, p. 30. *(c)* Notts, p. 15.
(d) Cheſhire, p. 21. Wright MS. *(e)* Annals, vol. 1. p. 285.
(f) Young's North Tour, vol. 3. p. 243.

OBSERVATION.

It is pretty generally known that an old graſs lay, or layer, as it is called in ſome counties, is an excellent preparation for potatoes. In Ireland it is almoſt the general method of breaking up old graſs land, to let it at very high rents to the poor people to plant potatoes on. Two methods of culture are here noted, plowing the lay and digging it; but there does not ſeem to be equal authority for the produce being ſo large from the plough as from the ſpade; which, in this caſe, appears to be a ſucceſsful mode of culture. Experiments made with a view to aſcertain this point ſeem, however, yet to be wanting.

SECTION II.

OF MOOR AND MOUNTAIN LAND AND BOG, AS A PREPARATION FOR POTATOES.

Authorities from the County Reports.

IN Dumbartonſhire the potatoe culture for improving waſte and moſſy ſoils, univerſally acknowledged to be of great advantage. Cutting down bruſhwood, and removing great ſtones, is the whole preparation previous to planting. The lazy bed-way always followed. *(a)*

In Weſt Lothian it is obſerved, that the upland parts of the county produce larger crops than the more cultivated and low ſituations. *(b)*

In Eaſt Lothian, in the high diſtrict, the crops more productive than in the low part of the county: ſixty bolls, barley meaſure, is not reckoned a great crop; but, in the low diſtrict, rarely more than forty or fifty *(c)*.

Sir W. Stirling, in Perthſhire, has often raiſed forty bolls of potatoes on an acre of light moor not worth 1s.—rent at 5s. only, here are two hundred rents. *(d)*

In Roxburghſhire, Baron Rutherford has found them the beſt means of bringing waſte lands into culture. *(e)*

In Dumbartonſhire, Sir James Colquhoun improved a peat moſs by planting potatoes in the lazy bed-way; ſowed oats after them, meadow ſoft graſs with the oats, which is excellently adapted to moſſy ſoils, as it ſpreads quickly. This was mown every year, the bog being ten or twelve feet deep, could not be paſtured *(f)*.

(a) Dumbarton, p. 52. *(b)* Weſt Lothian, p. 25. *(c)* Eaſt Lothian, p. 82. *(d)* Perth, p. 40. *(e)* P. 33. *(f)* Dumbarton, 52.

In the Highlands of Scotland, the faireſt and largeſt potatoes are produced upon the ſpongy moſſes, planted in lazy beds. *(g)*

They find, in Perthſhire, that moſſes when drained are a favourable ſoil for potatoes. *(h)*

Other Authorities.

Three acres cleared of goſs and broom, produced 900 buſhels without manure. *(i)*

Bogs well drained make great returns. No ſoil will produce a larger quantity than black moſs, or peat mixed with earth. *(k)*

At Charleville, they find that potatoes on bogs eſcape the froſt, when they are killed in the Highlands. *(l)*

Mr. Leſlie, in Ireland, reclaimed bogs by draining and then dunging for potatoes; the crop 320 buſhels per Engliſh acre; afterwards excellent meadow. *(m)*

At Mercra, in Ireland, the greateſt crops are gained from bogs; fifty buſhels per acre more than from graſs land. Much the beſt way of improving bogs; but they muſt have a little dung. *(n)*

Mr. Irwin, in Ireland, tried if paring and burning would do to improve a boggy moory mountain. It anſwered greatly, and yielded the beſt potatoes in the country. *(o)*

Mr. Browne, of Ireland, improved 20 acres of dry heath moor, which would not yield any rent, to 15s. an acre. He marled with white marl from under a bog 150 barrels an acre, ſpread and left a year; this killed the heath; ploughed twice and took two ſucceſſive crops of potatoes without dung; the firſt an extraordinary one, the ſecond not bad; then three crops of corn, and let it. *(p)*

Lord Altamont, in Ireland, manured a mountain moor with limeſtone gravel at 40s. an acre; left it two years and then let it at 40s. to the poor, to plant potatoes: after three noble crops of oats, then graſs, let at 16s. an acre. On another conſiderable piece of poor moor, manured with limeſtone gravel and ſhelly ſand, at 1l. 2s. 9d. an acre; ploughed and burned it, and ſowed turnips: a very noble crop. Then planted potatoes without other manure; the crop much the greateſt he ever ſaw in his life. From one ſtalk had 143 roots: three good crops of oats, ſowed white clover, and then worth 20s. an acre. On another piece, worth 5s. an acre, limeſtone gravel at 1l. 2s. 9d. an acre, left three years, and let to the poor at 3l. 10. for potatoes; then thrice oats; left for meadow, and worth 30s. an acre *(q)*.

(g) Eaſt Lothian, 81. *(h)* Perth, 40. *(i)* Iriſh Tour, vol. 2. p. 11.
(k) Paper diſperſed by Committee of Annexed Eſtates. Scot's Farmer, vol. 1. p. 339.
(l) Iriſh Tour, vol. 1. p. 60. *(m)* Vol. 1. p. 176. *(n)* Vol. 1. p. 284, 289.
(o) Vol. 1. p. 294. *(p)* Ibid. vol. 1. p. 297. *(q)* Vol. 1. p. 305, 306.

At Moniva, in Ireland, they plant potatoes in bogs, and get fine crops, draining and adding a little limeſtone gravel, or dung. (r)

Mr. French, at Woodlawn in Ireland, in various intereſting experiments, on a large ſcale, on improving bogs by planting potatoes after draining and manuring, met with great ſucceſs; the crops 12l. per acre. (s)

Mr. Bland, of Ireland, has improved much boggy land by liming, dunging, and planting potatoes: two crops great, and equally good. (t)

Mr. Shanley, in Ireland, on a bad red bog, four feet deep, had 1200 ſtone of potatoes per acre after draining, manured with limeſtone gravel, at the expence of 3l. an acre, alſo a common dunging; then ſowed barley twice, and laying it to graſs, became immediately worth 40s. an acre. (u)

At Swinton, in Yorkſhire, on black moory ſoil, 4s. 6d. an acre, 120 buſhels an acre to 158. (v)

Mr. Sturt, at Brownſea, on a black peat moor, at 4½d. an acre, gained 600 buſhels an acre. (w)

OBSERVATION.

The authorities that tend to elucidate this part of the ſubject, are, upon the whole, very ſatisfactory and important; and leave no reaſon to doubt that the culture of potatoes may be purſued on theſe lands with every rational hope of ſucceſs.

SECTION III.

POTATOES ON WOODLAND.

Mr. Abdy, of Eſſex, an Honorary Member of the Board, grubbed a wood, dunged it with 20 waggon loads an acre, and planted potatoes; produce 563 buſhels per acre; expence 16l. 13s. 6d. (x)

OBSERVATION.

This ſingle experiment may be of uſe to thoſe who grub up woods, as it may probably be found that no other crop is better adapted to be firſt had recourſe to on ſuch occaſions. It merits a trial to diſcover whether dung is neceſſary in ſuch caſes.

(r) Iriſh Tour, vol. 1. p. 339.
(s) Vol. 1. p. 344, 345, 347.
(t) Vol. 1. p. 465.
(u) Vol. 1. p. 517.
(v) Young's North Tour, vol. 2. p.
(w) Young's Eaſtern Tour, vol. 3. p. 264.
(x) Annals, vol. 10. p. 324.

SECTION IV.

IN YOUNG PLANTATIONS.

IN Shropſhire, Lord Clive finds it an excellent practice to permit the planting of potatoes in his young plantations, the ſeaſon after the young trees are put in the ground. The neighbouring cottagers are allowed to plant them; and if it is new, or maiden ground, no manure is put in for the firſt two years. The potatoes are not continued above three years, and are of great uſe to the young trees. (*y*)

Mr. Coke, of Holkham, Norfolk, permits the poor people to plant potatoes in his young plantations, and finds the cultivation beneficial to the trees. (*z*)

OBSERVATION.

In all caſes where the benefit to the planter and to the poor ſeems to be ſo reciprocal, as in this practice, it is much to be wiſhed that the ſame ſyſtem may be adopted. Merely to offer ſuch a hint to the public will, doubtleſs, have good effects.

SECTION V.

CULTURE WITH TURNIPS.

A VERY ſingular method of culture was invented by Mr. Walker, of Norfolk. Upon a clean turnip fallow he plants potatoes under the plough in June, and harrows in turnip-ſeed above them, timing it ſo that the turnips and young potatoe-ſhoots ſhall come to the hoe at the ſame time. He feeds the turnips off early in autumn, and then ploughs the land for wheat, gathering the potatoes at the ſame time. He has had a full crop of turnips, and 120 buſhels of potatoes per acre: the laſt worth 5l. (*a*)

Mr. Bell, of Dumfriesſhire, drills potatoes at four feet and a half; and the hoeing being over by the end of June, drills turnips in the intervals. (*b*)

OBSERVATION.

The Committee will by no means venture to recommend this practice; but the hint ſeems worth preſerving, as particular caſes may occur in which it may be adopted, and probably improved on.

(*y*) MS. Information. (*z*) Ditto. (*a*) Annals, vol. 9. p. 431.
(*b*) Wight, vol. 2. p. 430.

SECTION VI.

IN CORNERS OF FIELDS.

THE farmers in Leiceſterſhire give their labourers leave to plant ſuch ſpots: they plant and clean in mornings and evenings at their own time. Baulks and headlands there will give tolerable crops without manure. An excellent cuſtom. (*c*)

OBSERVATION.

The practice here, in few words deſcribed, appears to be a very important one, and highly beneficial to the poor people, who are thus indulged without any expence to the farmer, who grants ſo commendable a favour.

SECTION VII.

SOIL.

Authorities from the County Reports.

IN Selkirkſhire, they never thrive but on dry ſoils; and where wet ſpots happen, always of a watery ſubſtance; inferior in quantity, and worſe in quality. (*d*)

Other Authorities.

Potatoes will not grow on the rich *corkaſs* lands on the Shannon: a deep, very rich blue clay. (*e*)

In Mid Lothian, a large field of various ſoils, the whole planted, and the crop good on dry land; on the wet land, bad; and on the wetteſt, none at all (*f*).

Mr. Townley, of Belfield, planted four eyes, of the cluſter ſort, in four different kinds of ſoil.

No. 1.	A ſtrong rich loam, produced	34 lb.
2.	A light rich loam,	29
3.	A good gravel,	19
4.	A ſandy ſoil,	15 (*g*)

(*c*) Marſhal Midland Co. vol. 2. p. 93. (*d*) Selkirk, 30. (*e*) Iriſh Tour, vol. 1. p. 354.
(*f*) Wight, vol. 4. part 2. p. 622. (*g*) Georgical Eſſays, vol. 4. p. 46.

OBSERVATION.

The fact, that dry ſoils are much to be preferred for potatoes, ſeems well aſcertained; and it is one too important to be neglected by thoſe who are unaccuſtomed to the culture.

SECTION VIII.

OF MANURING.

Authorities from the County Reports.

IN Cheſhire, from 20 to 40 tons per ſtatute acre, worth from 3s. to 4s. per acre, ſpread before the laſt plowing. (*h*)

They uſe, in Cornwall, ore-weed, ſea-ſand, and dung. (*i*)

In Devonſhire, black peat earth, when mixed with lime or dung, produces good crops of excellent potatoes. (*k*)

At Aveley, in Eſſex, 10 loads an acre of raw dung (*l*).

In Lancaſhire, long dung from the yard is uſed; but dung from great towns produces moſt effect. (*m*)

In Weſtmoreland, 100 loads of dung per cuſtomary acre, 6760 ſquare yards (*n*). The land is then let at 2s. per perch for planting.

In the North Riding, 10 to 15 cart loads of dung per acre. (*o*)

In Elgin, dung is ſeldom applied to this root; the crops are 184 buſhels, ſuppoſing the Amſterdam ſtone to be 16lbs. (*p*)

In Mid Lothian, the dung, in ſome caſes, is ſpread over the whole field; and if the flavour of the potatoes is the object, they apply it to the preceding crop; but the produce is leſs. (*q*)

In Perthſhire, heavy crops raiſed by uſing fern, or leaves of trees, as manure; alſo by broom, chopped in pieces, and ſpread in lazy-beds, without the manure. (*r*)

In the Iſle of Man, ſea-weed is uſed as manure for them. (*s*)

In Berwickſhire, 15 to 25 loads per acre, in furrows ſtruck at two to three feet aſunder, by double earth broad ploughs, expanding at pleaſure (*t*).

In Dumfriesſhire, liming eſſential to prevent the rot: till it was uſed, ſuffered greatly; but never ſince. (*u*)

At Dunrobin, in Sutherland, when ſea-ware is uſed for potatoes, they are inclined to be tough and watery. (*x*)

(*h*) Cheſter, p. 20. (*i*) Cornwall, p. 38. (*k*) Devon. p. 58. (*l*) Eſſex. Vancouver.
(*m*) Lancaſter, p. 29. (*n*) Weſtmoreland, p. 20. (*o*) North Riding, p. 43.
(*p*) Elgin, p. 20. (*q*) M. Lothian, p. 68. (*r*) Perth, p. 20.
(*s*) Man, p. 22. (*t*) P. 39. (*u*) P. 17. (*x*) Rep. Northern Counties of Scotland, 142.

An Experiment with Alabaſter, on Potatoes, by Mr. Weſton, of Leiceſter.

In April I planted potatoes, half of which, as ſoon as cut, were put into powdered alabaſter, conſequently the cut part was covered with it, and then planted in drills, each ſet a foot aſunder; a ſmall quantity of alabaſter was ſprinkled upon each ſet beſides. After they were covered with earth, a little more was ſpread along the drills.

The other half was planted in the ſame manner, except without alabaſter; whilſt growing, no difference appeared betwixt them; but on taking them up in November, the potatoes to which the alabaſtar was applied, produced about one third more, and were larger. (*v*)

Other Authorities.

EXPERIMENT, NO. I, COMPARING MANURES FOR POTATOES.

Manure per Acre	Crop Buſhels.
53 Loads (cubical yards) farm-yard dung	400
160 Buſhels ſoot	360
160 Ditto wood-aſhes	240
32 Loads of dung	280
42 Ditto	360
No manure	180

EXPERIMENT, NO. 2.

32 Loads dung, and 40 buſhels of wood-aſhes	400
No manure	280
160 Buſhels of ſlacked lime	380
1½ Ton of barley ſtraw	300
340 Buſhels of pot-aſh	380
32 Loads of dung	400
32 Ditto, and 160lb. ſalt added at time of ſpreading	400
32 Ditto, and 160 buſhels lime	480
32 Ditto, and 480 gallons of urine	(*w*) 520

Mr. Billingſley not leſs than 20 loads, each 30 buſhels of *well rotted* horſe-dung: lime, marl, chalk, ſoaper's aſhes, and rags, do but little good: hog-dung next to horſe. Green vetches or clover, covered in by planting, is good manure. (*x*)

At Packenham, in Ireland, graſs-land manured with limeſtone gravel, will let to the poor at 5l. an acre, for planting. (*y*)

(*v*) MS. Papers of the Board. (*w*) Annals, vol. 9. p. 652, the editor.

(*x*) Annals. vol. 21. p. 4. (*y*) Vol. 1. p. 49.

Mr. Young, comparing different manures, had the following reſult:

			Buſh.		Second Year
No. 1.	No manure, produced		120	per acre	140
2.	Night ſoil	10 wag. loads	600		640
3.	Ditto	6 ditto	650		500
4.	Ditto	2 ditto	500		300
5.	Bones	10 ditto	650		640
6.	Ditto	6 ditto	640		560
7.	Ditto	2 ditto	560		240
8.	Hog-dung	60 one-horſe cart loads	480		300
9.	Ditto	30 ditto	480		160
10.	Yard compoſt	60 ditto	300		240
11.	Ditto	120 ditto	480		300
12.	Ditto	30 ditto	140		140 (z)

Mr. Barber compared dung, cob or mud-walls, and rotten ſtraw. An acre manured with dung was 637 buſhels, mud 320, rotten ſtraw 255. (a)

Sea-weed uſed with ſucceſs in Scotland, put in the furrows of the drills; then bear, then oats, and then potatoes again. All the crops good. (b)

In Inverneſsſhire they uſe fern as manure on lazy-beds; but the crops poor (c). The refuſe of peat ſtacks and peat aſhes, the beſt of all manure for potatoes. (d)

Mr. Greenhill, of Eaſt Ham, aſſerts that lime is pernicious; it ſpots, and even ſcabs, and eats into them. (e)

Mr. Townly, of Belfield, compared different manures.

		Produce, lb.
No. 1.	Coal aſhes only	211, rather ſmall
2.	Stable dung and coal aſhes mixed	344, very fine
3.	Stable dung alone	315, ditto
4.	No manure	134, very ſmall
5.	Compoſt, dung, lime, and ſoil	204, middling
6.	Stable dung cov. with com. yellow moſs	438, remarkably fine
7.	Soaper's waſte	383, very fine
8.	Stable dung and lime	268, tolerable
9.	Lime alone	187, ditto
10.	Coal aſhes and lime	192, ditto
11.	Stable dung and ſoaper's waſte	298, very good
12.	Soot ſoil and coal aſhes	271, ditto
13.	Salt and ſoil	200, ditto
14.	Saw-duſt and coal aſhes	190, ſmaller
15.	Stable dung and ſaw-duſt	307, very fine
16.	Dung of poultry and coal aſhes	236, pretty fine

(z) Soc. Tranſ. vol. 3. p. 70.

(a) Ibid. vol. 11. p. 89.

(b) Wight, vol. 3. p. 151.

(c) Ibid. vol. 4. part 1. p. 144.

(d) Ibid. p. 145.

(e) MS. Papers of the Board.

		Produce, lb.
17.	Dung of poultry and ſand	156, rather ſmall
18.	Saw-duſt and lime	197, ditto
19.	Decayed ruſhes and lime	208, very good
20.	Tanners bark and lime	76, very poor
21.	Bark and ſtable dung	144, rather larger
22.	Bark alone	35, very poor
23.	Stable dung and lime ſpread over the land	230, pretty fine
24.	Chopped whins, with a covering of lime over them	256, very fine

The manure in furrows of 5 feet lands. As ſtable dung and moſs ſeemed to have the advantage, they were carefully compared in another experiment; the reſult was a perfect equality. (*f*)

OBSERVATIONS.

From the nature of various manures applied to ſoils exceedingly different, it is neceſſarily impoſſible that the reſult ſhould be in any degree ſimilar, or that preciſe concluſions ſhould be eaſily drawn. Contradictions and difficulties do not always reſult from inaccuracy, but from hidden circumſtances which eſcape the experimenters. The term *load* is ſo undefined, that it ſhould never be uſed without ſome further ſpecification of weight or meaſure. There is, in this article of manure, an immenſe field yet open for future trials; and which highly deſerves the attention of thoſe who can make the requiſite experiments.

SECTION IX.

OF THE CULTURE BY PARING AND BURNING.

Authority from the County Reports.

THE common mode, in Cornwall, is to plant the end of April, or beginning of May; after paring and burning, produce from 400 to 540 buſhels per acre. (*a*)

Other Authorities.

About Annſgrove, in Ireland, they are exceedingly fond of paring and burning for potatoes; get very great crops by it; and, which never fail, eſpecially on waſte lands. Do it in March and April. (*b*)

(*f*) Georgical Eſſays, vol. 4. p. 48. (*a*) Cornwall, p. 38. (*b*) Iriſh Tour, vol. 1. p. 369.

On the mountains, near Clonmell, pare and burn for cluſter potatoes, and get very great crops. (i)

OBSERVATION.

Slight as theſe authorities appear, they touch upon an object of conſiderable importance; for this huſbandry, though but little regiſtered, has been very common for potatoes, and found to be very effective to raiſe on waſte and rough ſoils, without the aid of dung, great crops of potatoes. Experiments are much wanting to aſcertain the right depth of paring, and the degree of burning; as well as the beſt method of putting in the crop after this preparation.

SECTION X.

OF THE ROTATIONS IN WHICH POTATOES ARE INTRODUCED.

Authorities from the Reports.

AT Aveley, in Eſſex, wheat ſtubbles are ſown in autumn, with tares or rye, for ſpring food; then ploughed and planted for potatoes: theſe off in November, and white hotſpur peaſe planted for podding for London; ſucceeded by turnips. (a)

In Lancaſhire, turnips are ſown after a crop of potatoes. (b)

In Lancaſhire, potatoes have been ſucceſsfully planted for a ſucceſſion of years on the ſame land. (c)

Mr. Eccleſton, in Lancaſhire, ſold from 30 perches, 8 yards to the perch, 30 pounds worth of early potatoes in 1793. The land then ſown with turnips, which ſold at 6d. per buſhel, worth 50l. per acre; and then ſowed the land with wheat. (d)

Mr. Eccleſton had his beſt crop of common wheat in 1793 ſown ſo late as the 20th of March, after a crop of potatoes. (e)

At Fulham and Edmonton, in Middleſex, wheat is ſown after potatoes. (f)

Near Battle, in Suſſex, cultivated in the courſe, 1. Wheat; 2. Potatoes. The wheat always well manured. (g)

(i) Iriſh Tour, vol. 1. p. 511. (a) Eſſex, by Vancouver.
(b) Lancaſter, p. 28, (c) Ibid. p. 31. (d) Ibid. p. 31. (e) Ibid. p. 48.
(f) Middleſex Foot, p. 21. (g) Suſſex, p. 28.

In Weſtmoreland, an oat ſtubble preferred. (h)

Near Larington, in Wiltſhire, in the following courſe:

1. Potatoes
2. Wheat
3. Barley
4. Clover mown, and winter following. (i)

In the Eaſt Riding, cultivated in this courſe:

1. Potatoes
2. Wheat
3. Oats, barley, or peas. (k)

In the Iſle of Man, of a farm 180 acres arable, twenty-four are under potatoes. (l)

In the ſame iſland, a rotation not uncommon on good land, is,

1. Potatoes
2. Barley
3. Clover
4. Wheat
5. Oats or peaſe. (m)

On dry ſoils in Mid Lothian,

1. Potatoes well dunged
2. Wheat
3. Clover
4. Oats. (n)

In Renfrewſhire,

1. Oats from graſs
2. Potatoes
3. Oats
4. Graſſes. (o)

In Roxburghſhire, the ſecond year's crop is found to be better than the firſt, in quantity, quality, and ſize. (p)

In Selkirk,

1. Potatoes
2. Barley
3. Graſs. (q)

In Tweedale, barley ſown after potatoes. (r)

Mr. Yeald, of Herefordſhire, on clayey land,

1. Peas on clover
2. Wheat
3. Potatoes
4. Wheat
5. Oats and clover. (s)

(h) Weſtmoreland, p. 20. (i) Wilts, p. 52. (k) Eaſt Riding, p. 41. (l) Iſle of Man, p. 13. (m) Ibid. p. 30. (n) Mid Lothian, p. 59. (o) Renfrew, 9. (p) Roxburgh, 33. (q) Selkirk, 24. (r) Tweedale, 21. (s) Hereford, p. 60.

Other Authorities.

At Ryehope, near Sunderland,

1. Break up for oats
2. Potatoes
3. Wheat, or mazelin
4. Turnips
5. Barley
6. Potatoes
7. Wheat
8 Then graſs for five or ſix years. (*t*)

Mr. Mayo, of Battel,

1. Potatoes
2. Wheat for ſixteen years. (*u*)

Dr. Wilkinſon, of Enfield, plants them on clover lays, and gets 400 buſhels (*v*). Alſo four years in ſucceſſion on the ſame land; manured every year; crops all great. (*w*)

In Fifeſhire, turnips following potatoes, found highly to ameliorate. (*x*)

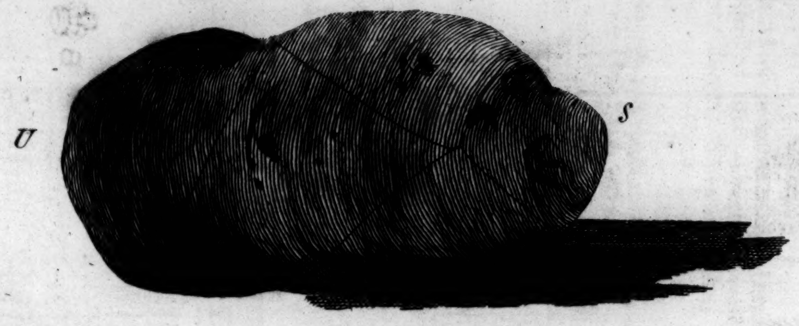
In Roſsſhire, waſte land planted with them, then peaſe, then barley, and graſſes; and all good. (*y*)

OBSERVATION.

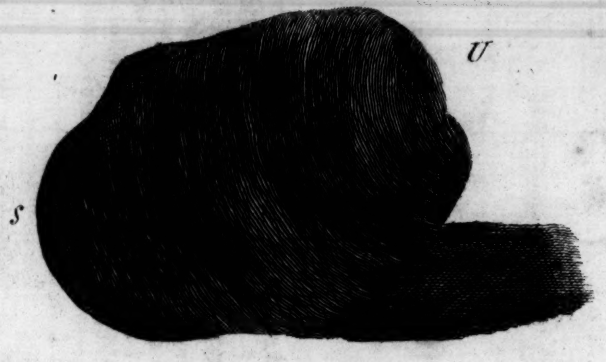
The courſes of crops in which potatoes may be introduced, are ſo various, that it can ſcarcely be expected that any thing very definitive ſhould be found in the experiments regiſtered. They offer little more than hints that deſerve to be purſued.

(*t*) Annals, p. 362. (*u*) Ibid. vol. 11. p. 248. (*v*) Vol. 20, p. 458. (*w*) p. 459.
(*x*) Wight, vol. 2. p. 260. (*y*) Ibid. vol. 4. part 1. p. 277.

N.o 1



N.o 2



S. Sprout or nose end of the Potatoe, U. the Umbilical or Tail end.

N.o 1 Divided into seperate buds by Lines. If the sprout end S. N.o 1 be preserved it is always used with all the Budds; they are close and thick together, but it is sometimes rejected, as is always the Umbilical end, N.o 2 Represents the manner of cutting the Potatoe, as described in the Lancashire Report. By taking one sett out of one Potatoe, the very middle of the plant, rejecting totaly the Umbilical & sprout end, This causes the greatest produce & finest Potatoe.

See Report P. 162.

Neele Sculp.t 352, Strand.

CHAP. III.

OF THE SETS.

Authorities from the Reports.

AT Ilford, in Eſſex, they plant very ſmall potatoes, or ſlices of larger ones; having one, two, or three eyes in each. (*a*)

Experiments have been made in Lancaſhire to aſcertain the beſt mode of cutting the ſets. A whole potatoe does not always ſucceed; but a large cutting has been found better than a ſmall one. Beſt to cut off the ſprout, or noſe-end, and alſo the umbilical or tail-end of the potatoe, rejecting both, and taking the middle entire for the ſet. The worſt method is cutting the potatoe down the middle from noſe to tail: a common practice. (*b*)

In Lancaſhire, the moſt approved method for early crops is, they cut the ſets and put them on a room-floor, where a ſtrong current of air can be introduced at pleaſure, two lays in depth, and covered two inches thick, with chaff, or ſaw-duſt. If deſired to be very early, they remain thus from November till March; much attention being paid to give or exclude air, according to the weather. (*c*)

In Northumberland, whole potatoes ſeldom or never uſed, but ſlices with one or two eyes. (*d*)

In Durham, ſixteen buſhels per acre, the rows from two to three feet, and one from plant to plant. (*e*)

Mr. Bower, of Nottinghamſhire, ſeven ſacks per acre every third furrow, and four inches aſunder. (*f*)

In Suſſex, eighteen buſhels per acre. (*g*)

In Wiltſhire, four and an half to ſix ſacks. (*h*)

In the North Riding, fifteen buſhels per acre; in one bout ridges, and ten inches from plant to plant. (*i*)

In the Iſle of Man, from eighteen to twenty buſhels per acre in the lazy-bed method. (*k*)

(*a*) Eſſex, by Griggs, p. 14. (*b*) Lancaſter, p. 29. (*c*) Ibid. 32.
(*d*) Northumberland, p. 40. (*e*) Durham, p. 70. (*f*) Notts, p. 13.
(*g*) Suſſex, p. 29. (*h*) Wilts, p. 52. (*i*) North Riding, p. 43.
(*k*) Iſle of Man, p. 36.

In Galloway, 11cwt. of ſeed to an acre in the lazy-bed method. (*l*).

In Tweedale, two bolls per acre. (*m*).

Other Authorities.

Mr. Macro found, that whole potatoes (not large) yielded more than cuttings. (*n*)

Mr. May, of Suffolk, fifteen buſhels an acre, in rows at two feet. (*o*)

Mr. Dann, of Kent, thirty buſhels an acre, rows twenty inches, ſets ten, two eyes to each. (*p*)

Dr. Wilkinſon, of Enfield, twenty buſhels an acre, eight inches by ſix. (*q*)

Mr. Billingſley chooſes the largeſt and fineſt potatoes for ſeed, ſlicing them in two pieces, from the crown to the root (*r*). Plants eight ſacks of 240 lb. an acre.

Mr. Woolward, of Suffolk, ſixteen buſhels an acre. (*s*)

Mr. Wagſtaff found that the parings of potatoes, taking one third of the root, yielded as good a crop as when the whole root was cut for ſets (*t*)

In Eaſt Lothian, potatoes cultivated from the ſeed, two ſorts, and no varieties whatever came; theſe from ſeed were exactly like the mother-plants. (*u*)

Mr. Higſon compared whole potatoes and cuttings; the former always produced a greater crop than the latter, in proportion to the quantity of ground. (*v*)

Dr. Anderſon, by ſeveral experiments, found that the crop was, in ſome meaſure, proportioned to the weight of the ſets (*w*); and never profitable to plant ſmall potatoes, or ſmall cuttings (*x*). Dr. Anderſon ſowed the ſeed of potatoes, but got no new varieties (*y*); but, in a ſucceſſive experiment, he found that ſuch were to be gained. (*z*)

Mr. Whimpey, repeating Dr. Anderſon's experiments, on large and ſmall, cut and uncut potatoes for ſets, found that the difference between whole potatoes and cuttings in acreable produce, was quite immaterial; but that, in ſaving of ſeed, it was greatly in favour of cuttings, to the amount of 1l. 19s. 8d. an acre, as the uncut potatoes demanded thirty-ſeven buſhels and a half per acre: the experiment repeated the year following; the reſult the ſame (*a*). The cut, only twenty and a half. (*b*)

(*l*) Galloway, p. 6. (*m*) Tweedale, p. 25. (*n*) Annals, vol. 7. p. 505.

(*o*) Vol. 18. p. 314. (*p*) Vol. 20. p. 231. (*q*) Vol. 20. p. 458. (*r*) Vol. 21. p. 5.

(*s*) Vol. 23. p. 31. (*t*) Soc. Tranſ. vol. 7. p. 98. (*u*) Wight, vol. 2. p. 152.

(*v*) Bath Society, vol. 1. p. 28. (*w*) Ib. vol. 4. p. 14. (*x*) Ib. p. 20.

(*y*) Ib. vol. 4. p. 92. (*z*) Ib. vol. 5. p. 127. (*a*) Ib. vol. 6. p. 207.

(*b*) Bath Society, vol. 5. p. 234.

Sir Thomas Beevor alſo, making a ſimilar experiment, found,

1. That fifteen potatoes, whole weight 3lb. 6 oz. planted on ſixty ſquare feet of ground, produced 9ſt. 10lb.

2. That fifteen of the ſame weight, alſo, planted on forty-five ſquare feet, produced 4ſt. 3lb.

3. That ſeven potatoes and a half, cut into fifteen ſets, weight 1lb. 11 oz. planted on ſixty ſquare feet, produced 3ſt. 5lb.

4. That ſeven and a half of the ſame weight, cut into fifteen ſets, and planted on forty-five feet, produced 2ſt. 10lb.

5. That fifteen potatoes, cut into forty-ſix ſets, and weighing 3lb. 6oz. planted on ninety-two feet, produced 10ſt. 1lb.

1, 2, and 5: One noted to be outſide rows; 3 and 4, inſide ones. (*c*) It is remarkable that the greateſt products were the outſides.

Mr. Whyn Baker, in Ireland, tried very ſmall ſeed, or ſets, on compariſon with reaſonably large; alſo with very large,

	lb.	oz.
Reaſonably large, produce	84	3
Very ſmall	64	12
	19	7

This upon an acre would be a prodigious difference; but the difference between the reaſonably and very large, was little or nothing. (*d*)

Mr. Williams, near Coventry, comparing hillocks at four feet; ſome with three or four ſets, and others with one; the latter produced as much as the former (*e*)

OBSERVATION.

On the quantity planted per acre, authorities might have been greatly multiplied; but as it muſt depend much on the ſize of the cuttings, as well as on the manner of planting, it was thought better to confine them to a few leading points. A good deal has been done in this enquiry, but there remains much to do; for the queſtion of cuttings does not ſeem to be clearly decided by ſufficient experiments, not to notice ſome ſtrong contradictions in thoſe experiments; which prove, that more trials are neceſſary to aſcertain the various queſtions that relate to cuttings.

(*c*) Bath Society, vol. 5. p. 427.

(*d*) Experiments in Agriculture, reported to the Dublin Society, 1771. p. 109.

(*e*) Georgical Eſſays, vol. 4. p. 75.

PLANTING THE SHOOTS.

Thiſs practice, which is not unknown in England, having been formerly attempted, has received particular attention from the Dublin Society; who have printed and publiſhed a Memoir on the ſubject, containing Dr. Maunſel's experiments, in this method, and a great variety of teſtimonies in its favour. Every perſon knows, that in the ſpring, potatoes ſhoot out, and that in ſtirring, moving, or cutting ſlices, many of theſe ſhoots fall off, and are commonly thrown away. They may, however, be preſerved and planted with ſucceſs, inſtead of cuttings; by which means there is a ſaving of all the expence of ſeed.

CHAP. IV.

OF THE METHOD OF PLANTING.

SECTION I.

OF THE LAZY-BED METHOD.

Authorities from the Reports.

THIS method is practiſed in Cheſhire; the land ploughed before Chriſtmas; in April ploughed acroſs and harrowed; then ploughed deeply into beds five feet wide: the end of April, or beginning of May, the ſets are dibbled in eight or ten inches aſunder. In three weeks, or as ſoon as the buds appear, trenches are dug between the beds, and the plants covered with two inches of ſoil, ſpread equally; hoed, and weeded: the crop dug. (*a*)

In the Iſle of Man, on coarſe ſoils, this method adhered to: the butts, or beds, are from ſix to ten feet wide; the trenches from two to three feet; the manure is ſpread on the ſurface of the beds; the cuttings placed at ten inches aſunder, on the dung, and covered with the earth out of the trenches; when the plants appear, a ſecond covering of finer mould; the two, four inches deep: hoe and weed. (*b*)

Drilling is certainly not ſo productive as planting in beds five feet wide, and covering them on the trenches: the Frodſham method, where the planters are allowed to produce the greateſt quantity in the kingdom. (*c*)

In Galloway, they make their beds five or ſix feet wide; place the ſeed amongſt dung, or ſea-weed, which they cover from a trench on each ſide the bed. (*d*)

In the Iſle of Lewis, the cultivation in this method is found to be the moſt ſucceſsful preparative for corn. (*e*)

In the Iſle of Harris, 200 large creels of ſea-ware are neceſſary to plant 13 barrels of potatoes; all in this method of culture. (*f*)

(*a*) Cheſter, p. 20. (*b*) Iſle of Man, p. 35. (*c*) Lancaſter, p. 28, Wright, MS.
(*d*) Galloway, p. 6. (*e*) Hebrides, p. 14. (*f*) Ibid. 18.

In Perthſhire, when new ground is to be improved by a potatoe crop, they are planted in lazy-beds. (*g*)

In Ayrſhire, lazy-beds are almoſt entirely laid aſide. (*h*)

Other Authorities.

Produced leſs with Mr. Macro, in Suffolk, than rows. (*i*)

Mr. Billingſley, on comparative experience, prefers this method to drilling; makes his beds five feet wide, the alleys three feet; the ſets, one foot apart, covering not more than three inches deep with the earth. (*k*)

At Dolleſton, in Ireland, on rich leys, without dung, crop ſixty barrels. (*l*)

Near Dublin the beds ſeven feet broad, and the trenches three and a half, and eighteen to twenty inches deep, in order to bring up ſome limeſtone gravel; always dung 320 one-horſe loads, ſix to a ton. (*m*)

In Fifeſhire, the greateſt crop ever raiſed there, was by raiſing an old ſward with the ſpade and laid flat; the ſward then dibbled, when the plants appeared covered with earth, and repeated till ten inches thick; produce 126 bolls per acre (*n*). This is plainly the lazy-bed way.

Common-digging compared with lazy-beds, by Mr. Parkinſon of Doncaſter,

Lazy-beds, produced	2904 pecks per acre
Common method	1210
Superiority	1694 (*o*)

OBSERVATIONS.

The practice, in this method of planting, which, is univerſal in Ireland, meets with great oppoſition in England, except in the few diſtricts mentioned in theſe authorities. Experiments are rather contradictory; and while this mode is here highly commended, it will be ſeen in the next Section, that the general practice of the kingdom is in another method. It does not hence reſult that the trials have been inaccurately made, or that any of the parties are miſtaken; each method may be peculiarly adapted to certain ſoils and ſituations. In rough uncultivated ground, the lazy-beds may be preferable; and in even cultivated lands, other modes. It muſt, however, be confeſſed, that experiments are much wanted to aſcertain exactly the circumſtances in which the lazy-bed method ſhould, in preference, be adopted. The enquiry is important, and deſerves an attention it has not yet met with.

(*g*) Eaſt Lothian, p. 39.
(*h*) Ayrſhire, p. 26.
(*i*) Annals, vol. 7. p. 506.
(*k*) Vol. 21. p. 5, 6.
(*l*) Iriſh Tour, vol. 1. p. 10.
(*m*) Vol. 1. p. 7.
(*n*) Wight, vol. 1. p. 227.
(*o*) MS. Papers of the Board.

SECTION II.

IN DRILLS.

Authorities from the Reports.

MR. CROOK, of Wiltſhire, ſtrews the dung in the furrow, and covers it with the plough; then dibbles in the ſets at ſix inches aſunder triangularly; rows four feet apart, ploughs between, from, and to. (*a*)

In Cumberland, plough the land till ſufficiently fine. Strike furrows thirty inches at a diſtance; place the ſets at the bottom of the furrows, the dung laid on them; cover with the plough. (*b*)

In Durham, they are planted in drills from two to three feet aſunder, and one foot from plant to plant. (*c*)

In the Iſle of Wight, little farmers and the labouring poor are the only planters; they ſet them in rows at a foot diſtance. Crops eighty-five ſacks per acre. (*d*)

In Herefordſhire, Mr. Yeald plants the rows five or ſix feet diſtance. (*e*)

In Lancaſhire, they make their drills three feet aſunder, the ſets nine to twelve inches. (*f*)

In Northumberland, they are cultivated in drills, from thirty-two to thirty-ſix inches diſtance, twelve inches ſet to ſet. (*g*)

In the North Riding, drilled in one bout ridges. (*h*)

In the Iſle of Man, they drill and alſo plant in the lazy-bed method: the greateſt crops are gained by the latter. (*i*)

In Elgin, planted in rows, from three to four feet diſtance. (*k*)

In Clydeſdale, in drills, from two feet ſix inches to two feet nine inches aſunder. (*l*)

In Forfar, are planted in drills like turnips: Crop, fifty-five bolls of ſixteen ſtone, Amſterdam. (*m*)

In Tirey, in drills, they yield from eight to thirty-two times the ſeed; but in lazy-beds only five times. (*n*)

In Dumfriesſhire, they prepare for drilling by ploughing ſtubble after harveſt; harrow well in the ſpring, and plough acroſs; then lime, if not limed formerly. At the ſeaſon of planting harrow well, and plough into ridges three feet and a half, four, or four feet and a half, dung the furrows, plant ſix or ſeven inches ſet to ſet; cover with one bout of the plough: in two or three weeks complete the ridges, horſe, and hoe, and weed. (*o*)

(*a*) Mr. Crooks MS. information. (*b*) Cumberland p. 22. (*c*) Durham, p. 70.
(*d*) Hants, p. 81. (*e*) Hereford, p. 63. (*f*) Lancaſter, p. 28.
(*g*) Northumberland, p. 40. (*h*) North Riding, p. 43. (*i*) Iſle of Man, 36.
(*k*) Elgin, p. 20. (*l*) Clydeſdale, p. 62. (*m*) Forfar, p. 14.
(*n*) Hebrides, p. 42. (*o*) Dumfries, App. p. 16.

In Mid Lothian, from eighteen inches to four feet diſtance, and from nine to twelve inches, plant to plant. (*p*)

In Weſt Lothian, after two or three ploughings, plant by the plough every ſecond furrow, or in drills, from twenty, to thirty inches apart, and ten or twelve inches from plant to plant. (*q*)

In Selkirkſhire, they are planted in drills, from two to three feet diſtance, eight inches from plant to plant; ſometimes in every third or fourth furrow, in the courſe of ploughing. Drilling is preferable. (*r*)

In Berwickſhire, Surinam in rows, three feet diſtance. (*s*)

Other Authorities.

Mr. Bucke, of Suffolk, ploughed the land which was under potatoes the preceeding year, deeply covering a thin coat of ſhort dung; dropt the ſets in every ſecond furrow, from twelve to fifteen inches diſtant. Produce 628¼ buſhels per acre. (*t*)

At Ryehope, near Sunderland, in rows fifteen inches aſunder, nine inches from plant to plant. Produce 169 buſhels. (*v*)

Mr. Macro, in Suffolk, found that a ſingle row, on three feet ridges, yielded more than a double row on the ſame ſized ridges. (*u*)

Mr. Mayo, of Battel, opens furrows three feet aſunder, in which the dung, ſixty loads of ſixteen buſhels and ſets, covers with hand-hoes. Cluſter crop 450 buſhels: tried four feet, but three better. (*w*)

Mr. Dan, of Kent, plants with the plough in every other furrow; the rows twenty inches, the ſets ten, and the horſes three at length, *walking on the land.* (*x*)

Mr. Young having manured the ſurface of the fields, planted every ſecond furrow in turning in the dung, laying the ſets cloſe under the unſtirred land, to be out of the way of the horſes feet (*y*). Crops better than rows at three feet.

In Ayrſhire, drills at four feet yield forty bolls per Scotch acre. (*z*)

In Dumbartonſhire, in rows at three feet dunged; the next year in the intervals without more dung. Crops 12l. an acre. (*a*)

In Fifeſhire, drills at eighteen inches dibbled, plants at one foot. Produce ſeventy bolls, at twenty-two ſtone, Amſterdam. (*b*)

Mr. Scroope, in Yorkſhire, in furrows, come up at two feet, one foot in the rows, a handful of dung to each, or five loads per acre; average crop 216 buſhels. (*c*)

(*p*) Mid Lothian, p. 68. (*q*) Ibid. p. 26. (*r*) Selkirkſhire, 30. (*s*) Ibid. 131.
(*t*) Annals, vol. 5. p. 252. (*v*) Ib. vol. 5. p. 262. (*u*) Ib. vol. 7. p. 505.
(*w*) Ibid. vol. 11. p. 249. (*x*) Vol. 20. p. 231. (*y*) Society Tranſ. vol. 3. p. 79, 89.
(*z*) Wight, vol. 3. p. 190. (*a*) Ib. p. 296. (*b*) Ib. vol. 1. p. 25.
(*c*) Young's North Tour, vol. 2. p. 370.

Mr. Dann's method is this: To plough the ground in the autumn of winter; as ſoon as barley ſowing is finiſhed, carry out the dung (twenty large cart loads per acre, which if rather long he prefers) ſpreads and ploughs it in immediately with two ploughs following each other, the horſes (three in each) ſingle, and on the land, leſt by walking in the furrow they might deſtroy or injure the ſets; women and children ſufficient following to drop the ſets; which as each furrow is ploughed ten inches wide, will be twenty inches, and the ſets in the furrow nine or ten inches apart; nine perſons are in general ſufficient, and, on the average, two and a half acres per day are planted. The expence for ſpreading dung, ploughing, and planting, is about 14s. per acre; a ſlight harrowing, and rolling with a light roller, if neceſſary, is all that is done until the plants appear.

Mr. Haſſal recommends to ſet the drills four feet apart, inſtead of three, as ſome adviſe. He has always found the former conſiderably more productive than the latter. *(d)*

In June laſt, ſays a correſpondent of the Board, as I was looking at a crop of potatoes, of about three quarters of an acre, planted by Mr. Watts, a gardener, near Leiceſter, I obſerved an eighth part of the crop to be at leaſt ſix inches higher than the other part of the field. This naturally led me to enquire the reaſon of it, by ſeeing ſo great a difference. He anſwered me, that the ground was all of it digged and manured alike, exactly of equal quality all over; that the potatoes were of the ſame ſort, and that moſt of them were planted the ſame day, with only this ſmall difference, that on the part which was the moſt vigorous, drills were made by a land-hoe, about a foot aſunder; the others, by mere accident, were ſet by a dibble, or ſetting-ſtick, at the ſame diſtance. I frequently viſited the crop whilſt growing, and obſerved the ſuperiority increaſing all the ſummer, till the drilled crop was fit to take up, when the ſtems were about a foot higher, and forwarder by nearly a month, as ſome of the other were taken up the ſame day to ſee the difference. During the ſummer, they were equally hoed alike three times; and on taking up the whole field, and comparing them together, the produce was about one quarter more from the drilled crop than the dibbled or ſet one. The potatoes were larger, and nearly a month earlier; which is another great advantage, by having the ground at liberty ſooner for another crop. The difference, in my opinion, ariſes from this cauſe: In drawing a drill with a hoe, the earth is left in a fine pulverized ſtate, and the potatoe ſet is afterwards covered with ſimilar earth; the roots conſequently have very fine earth to ſtrike into. On the contrary, the hole made with a dibbler, or

(d) MS. Papers of the Board.

ſetting-ſtick, which in general is ſhod with iron, hardens and glazes the earth around it, leaves a hole at the bottom, and the earth is hardened on the ſides where the roots are to ſtrike into; and if much rain enſues ſoon afterwards, the hole may probably be filled with water (e).

OBSERVATION.

It is very difficult to draw any concluſions on the ſuperiority of one method to another from experiments not made comparatively on the ſame ſoil, and at the ſame time. The method of drilling appears to be much the cheapeſt; from which circumſtance it may reſult, that a ſmaller crop may be more beneficial than a larger one, gained by a more operoſe culture. The right diſtance of placing the rows is by no means aſcertained; it will probably be found to depend on the richneſs of the ſoil, and on the degree of the manuring. It is much to be wiſhed that the experiments neceſſary to aſcertain this point may be made with accuracy.

SECTION III.

DIBBLING.

Authority from the Reports.

AT Aveley, in Eſſex, they plough in the manure, and dibble in the ſeed upon every furrow, ten inches apart and four deep; produce 201 buſhels per acre. (a)

Other Authorities.

At Ilford, in 1784, plough in autumn, dung well, plough in the ſpring: a man dibbles acroſs the lands, a woman drops the ſets twelve or fourteen inches apart, 17 cwt. per acre; labour ſeven to eight ſhillings; crop eight to fifteen tons. (b)

Some farmers have tried putting in with the ploughſhare, and alſo ploughing them up; but, from much experience, are decidedly of opinion, that the other method is ſuperior. (c)

Mr. Bucke, of Suffolk, ploughed very deep, covering with a few loads of ſhort dung, dibbled at ten inches. The Pink Noſe potatoes and Dutch upright ſpecies produce 434 buſhels. Planted the year following with the Champion ſort: the crop great. (*d*)

(e) MS. Papers of the Board. Mr. Weſton, Secretary to the Leiceſter Society.

(a) Eſſex, by Vancouver. (b) Vol. 2. p. 99. (c) Vol. 2. p. 100.

Dr. Wilkinſon, of Enfield, dibbles every furrow eight inches, and the ſets ſix. Crop 400 buſhels. (*e*)

OBSERVATION.

The method here deſcribed is that generally practiſed by the greateſt planters perhaps in the kingdom (thoſe in Eſſex) by whom London is chiefly ſupplied. Great attention is due to the mode preferred by ſuch men whoſe ſcale of practice is ſo reſpectable; their crops, however, do not appear (the vaſt advantage of London dung conſidered) to riſe into ſuch ſuperiority as to allow any one to draw deciſive concluſions. Here then is a field for moſt intereſting comparative experiments, which ſeem particularly to be wanted.

SECTION IV.

BY THE HOE.

Authority from the Reports.

IN the North Riding of Yorkſhire, where they plant about twenty inches aſunder, the dung is laid in the furrows, the ſets on the dung, and covered by drawing the mould upon them with hoes: when the plants appear, they are earthed up by the plough. (*a*)

Another Authority.

At Sandy, in Bedfordſhire, they plant by hoeing holes, and cover by the next row of holes: come up about a foot ſquare. (*b*)

(*d*) Vol. 5. p. 252. (*e*) Vol. 20. p. 458. (*a*) North Riding, p. 43.

(*b*) Annals, Vol. 18, p. 225.

SECTION V.

ABOVE OR UNDER THE DUNG.

Authorities from the Reports.

IN Lancaſhire, the ſets are placed upon the dung. (*a*)

In the North Riding, they dung in the furrows, and the ſets upon the dung. (*b*)

In Northumberland, the ſets at the bottom of the drills, and the dung over them; the ſoil turned upon the hole, by the plough ſplitting one bout ridges. (*c*)

In Annandale, if the land be a light dry ſoil, it anſwers well to ſpread the dung in the furrows above the plants; but in a heavy ſoil, the potatoes above the dung. (*d*)

In Cheſhire, on ſhallow-ſoiled land, after two ploughings and harrowing, a furrow about four inches deep is turned, the manure ſpread lightly in the hollow of it; the ſets having been previouſly dropped eight or ten inches aſunder: the furrow is then turned back upon the ſets; the rows eighteen inches aſunder. When the plants appear, the balk is ſplit, and the plants covered, hoed, and weeded. (*e*)

Other Authorities.

Mr. Whyn Baker, in Ireland, tried this, in experiments made with the utmoſt degree of attention, and found the produce

	lb.	oz.
Over the dung — —	105	4
Under the dung — —	84	3
Difference —	21	1

which is a prodigious difference. (*f*)

It is injudicious to place the manure over the ſets; the roots run obliquely downward, and do not produce fruit; it is the lateral ſhoots that bear. When the manure is under the ſets, the roots pierce into it, and extract their food. (*g*)

(*a*) Lancaſter, p. 29. (*b*) North Riding, p. 43. (*c*) Northumberland, p. 40. (*d*) Dumfries, App. p. 29. (*e*) Cheſter, p. 21. (*f*) Baker's Experiments in Agriculture, reported to the Dublin Society, 1771. p. 108. (*g*) Georgical Eſſays, vol. 2. p. 108.

SECTION VI.

IN HILLOCKS.

Dr. Hunter has in his *Georgical Eſſays* inſerted ſome experiments which recommend the method of planting one, two, three, or more ſets in ſmall hillocks, like hop-hills, at four feet ſquare. The hint merits attention; and the more, as the experiments hitherto regiſtered do not appear to have been ſufficiently numerous or comparative to aſcertain how far the practice is really beneficial.

SECTION VII.

BEANS AMONGST POTATOES.

Mr. Hollins has dibbled in beans along the rows of potatoes as ſoon as planted; which were productive without the leaſt injury to the potatoes. (a)

(a) Society Tranſactions, vol. II. p. 80.

CHAP. V.

OF THE TIME OF PLANTING.

Authorities from the Reports.

FOR early potatoes, in Cheſhire, the ſets during winter are carefully guarded from froſt in a warm place, where they may ſprout at leaſt three inches by the beginning of March; after that time, the firſt favourable ſeaſon they are, with the ſprout on, carefully planted in a dry ſoil, covered at nights with ſtraw or ruſhes as long as froſts continue: ready to take up the middle of May. (*a*)

About Penzance, they plant the Kidney Potatoe at or before Chriſtmas; which they take up in May, and replant the ſame ground with the Apple Potatoe. The crops of both large; but the ſecond double the firſt. (*b*)

At Aveley, in Eſſex, planting is generally finiſhed by the firſt of June. (*c*)

In Lancaſhire, April the prime ſeaſon; but frequently through May, and even in June; and though the quality from theſe late plantings are not equal, yet the crops abundant. Spring froſts often miſchievous to early planted crops. (*d*)

In the Iſle of Man, from the end of March till the middle of May. About the firſt of May gives the greateſt crops. (*e*)

In the Carſe of Gourie they obſerve, that the quality of the potatoe depends greatly on the time of planting: it muſt be planted early (that is, the beginning of April) to be dry and mealy. (*f*)

In Mid Lothian, generally in April; but ſometimes as late as the firſt of June (*g*). The earlieſt planted make the beſt or moſt mealy potatoe; but are more liable to be curled, and always leſs prolific. Late planted, watery; crop more abundant, and curl ſeldom.

In Ayrſhire, they are planted in the month of June. (*h*)

(*a*) Cheſter, p. 18. (*b*) Cornwall, p. 38. (*c*) Eſſex, by Vancouver.
(*d*) Lancaſter, p. 29. (*e*) Iſle of Man, p. 36. (*f*) Carſe of Gourie, p. 15.
(*g*) M. Lothian, p. 68 and 9. (*h*) Ayrſhire, 26.

Other Authorities.

July 10, 1784, they were planting at Ilford upon land cleared of winter tares for ſoiling, and would continue a fortnight longer. *(i)*

May, found the beſt ſeaſon, by Mr. Mayo of Battel. *(k)*

Mr. Dann, of Kent, prefers April. *(l)*

Dr. Wilkinſon, of Enfield, May. *(m)*

Mr. Billingſley, April and May; beſt in dry weather. *(n)*

Mr. Woolward, of Suffolk, finds on experiment, that the beſt ſeaſon of all is the middle of June; and is ſo convinced, that he would *idle away* his time rather than plant in May. *(o)*

Near Bath, planted in June, and produced 440 buſhels per acre. *(p)*

OBSERVATION.

The information under this head is ſo various, that no poſitive concluſions can be drawn. Early planting may be very uſeful in ſeaſons in which the ſpring froſts are not ſevere; but when ſuch happen, the later periods may be more beneficial. The ſort of potatoe, the ſoil, and the manuring may alſo cauſe variations to be neceſſary. Experiments are much wanting to aſcertain how far this is or is not the caſe; they ſhould be repeated for ſeveral years, and the ſeaſons exactly obſerved and noted.

(i) Annals, vol. 2. p. 99. *(k)* Ibid. vol. 11. p. 248. *(l)* Vol. 20. p. 231.
(m) Vol. 20. p. 458. *(n)* Vol. 21. p. 5. *(o)* Vol. 23. p. 32.
(p) Bath Society, vol. 2. p. 356.

CHAP. VI.

CULTURE WHILE GROWING.

UNDER this Head are to be conſidered, Cleaning before the plants appear, horſe-hoeing, earthing, and cutting or feeding the tops. Of hand-hoeing, it is not neceſſary to be particular; becauſe, in whatever method planted, all are hand-hoed univerſally.

SECTION I.

CLEANING BEFORE THEY APPEAR.

Dr. Wilkinſon, of Enfield, planting very cloſe, hand-hoed the land twice before the potatoes appeared, and thus cauſed a clean crop. (*a*)

Mr. Young found very great benefit in going over the land with a broad ſhim, cutting ſhallow, to deſtroy the young weeds that appear before the potatoes come up. (*b*)

SECTION II.

HORSE HOEING.

Authorities from the Reports.

IN Lancaſhire, their drill crops at three feet are ploughed between, from, and to the rows, and worked by a ſmall triangular harrow, then a double-wreſted plough ſtrikes each interval. (*c*)

In the North Riding, their one-bout ridges are harrowed down as ſoon as the plants appear; left ſo a week or two; when the weeds appear they are earthed up by the plough. In another week or two they plough from the rows, then hand-hoe, and earthed up with the plough. (*d*)

(*a*) Annals, vol. 20. p. 458. (*b*) Society Tranſ. vol. 3. p. 80.
(*c*) Lancaſter, p. 29. (*d*) N. Riding, p. 43.

In Dumfriesſhire, beſides much attention to keep the rows clean, as ſoon as the young plants appear, they harrow, not acroſs, but in the direction of the furrows. *(e)*

Other Authorities.

Mr. Billingſley, after the plants have been up about three weeks, hoes them; but by no means lets the hoe be uſed after the plants begin to throw out their ſtrings; removes weeds by hand. Horſe-hoeing cuts the potatoes, and tears the fibres or ſtrings on which the bulbs are formed. *(f)*

Mr. Dann, in the courſe of the ſummer, generally horſe-hoes thrice; by the laſt of which they are earthed up by a circular iron plate, fixed to the ſtem of the brake or horſe-hoe; ſometimes an additional earthing is given; but the plate of the hoe ſhould be cut two or three inches narrower before the laſt horſe-hoeing, otherwiſe the young potatoes may be injured. *(g)*

OBSERVATION.

So many cultivators horſe-hoe their crops quite through the period of growth, and apparently without injury to the crop, that the hints here given againſt cutting the bearing ſtrings, throw ſome little obſcurity on the ſubject. Probably the hoeing, when ſucceſsful, is done tenderly, and in every operation receding from the rows. Such a conduct will unite with the other idea: but experiments are wanting fully to explain the degree of approach relative to the growth, and alſo what variations different ſorts of potatoes may occaſion.

SECTION III.

EARTHING UP.

Authority from the Reports.

IN Northumberland, the drills ploughed between, and as the ſtems advance in height, they are earthed up by a double-mould-board plough. *(a)*

(e) Dumfries, App. 17.

(f) Vol. 21. p. 5, 6.

(g) MS. Papers of the Board.

(a) Northumb. p. 40.

Other Authorities.

Mr. Dann, of Kent, conſiders this as the chief object in horſe-hoeing; his rows twenty inches; the more they are earthed up, the greater the produce. *(b)*

Mr. Higſon earthed up ſome rows, and did not earth up others; but found not any difference. *(c)*

SECTION IV.

FEEDING, OR CUTTING OFF THE TOPS.

Authorities from the Reports.

IN Herefordſhire, Mr. Yeal, about Michaelmas, a week or two before taking up the crop, turns in ſheep to eat the tops; which they do moſt greedily. Operates greatly in the diſcharge of urine. *(d)*

Cutting off the tops, aſſerted to be beneficial to the roots. *(e)*

Other Authorities.

From the end of September to the middle of November, Mr. Groſett, of Cornwall, cuts a load of tops every morning and gives to his working oxen, who eat them greedily. He fed ſix thus that were in conſtant work; and made in conſequence more manure than from any other crop. *(f)*

Monſ. Parmentier ſays, that the tops of the cluſtered ſort may be cut in September; but that there are many ſorts which ſuffer much by cutting. *(g)*

In Dumfriesſhire, cutting the tops found not to injure the roots *(h)*; and the ſame in Peeblesſhire. *(i)*

Mr. Greenhill, of Eaſt Ham, ſays, that to cut off the haulm or head, or touch to damage it, unqueſtionably hurts the roots. No growth of them after cutting it. *(k)*

Dr. Anderſon tried by experiment to aſcertain the queſtion, by cutting the tops from Auguſt 2 to September 5, and found the loſs in produce

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(b) Annals, vol. 20. p. 232. *(c)* Bath Society, vol. 1. p. 28. *(d)* Hereford, p. 64.
(e) MS. Papers of the Board, Mr. Barnard. *(f)* MS. Information.
(g) Traité de Pommes de Terre, p. 115. *(h)* Wight, vol. 2. p. 430.
(i) Ib. vol. 2. p. 478. *(k)* MS. Papers of the Board.

exceedingly great from cutting all through Auguſt; and from the September cutting, 93 buſhels per acre were loſt. (l)

Mr. Dann conſiders the haulm of potatoes valuable for littering yards; the manure ariſing thereby, in his opinion, is better than from either ſtubble or ſtraw. (m)

OBSERVATION.

The contradictions in this Section are ſo ſtrong, that we muſt either ſuppoſe that the fact varies with different ſorts of potatoes, or that the time of cutting has been different. To cut them in full luxuriance, or when ready to fade, muſt have very different effects. Experiments are wanting here, as in ſo many other caſes.

CHAP. VII.

OF DISTEMPERS, &c.

THE CURL.

Authorities from the Reports.

IN the North Riding of York, they procure their ſeed from the Moorlands, or from Scotland, to avoid the curl: the firſt year, free; the ſecond, ſome curled; the third, almoſt all. (a)

It is ſingular, that the diſtemper of the curl is unknown in the higher diſtrict of Weſt Lothian, at an altitude of about 400 feet above the level of the ſea: brought from that diſtrict, they continue ſound for two years;

(l) Bath Society, vol. 4. p. 43.

(m) MS. Papers of the Board.

(a) North Riding, p. 43.

but aſterwards become curled *(b)*. On this paſſage Mr. Somerville remarks, A piece of ground (deep loam) was well manured with lime, and planted with potatoes; when the plants appeared above ground, nearly three-fourths of them were curled; while at the ſame time a few drills, immediately adjoining, which had got no lime upon the ſoil, and planted with the ſame ſeed, were entirely free from the diſtemper. This circumſtance attracted notice, and the ſame experiment was repeated next year, with the ſame reſult. Since that time the Author of the preſent Memoir has paid particular attention to thoſe ſituations in which the curl is moſt frequent, and he has uniformly found it to prevail moſt in the diſtricts where much lime or aſh-dung is uſed. He has alſo obſerved, that in thoſe parts where the lime-huſbandry is but partially practiſed, ſuch as the hills and uplands, ſcarce any ſuch thing as the curl is known. There is one circumſtance in theſe upland ſituations that may operate as a preventative to this diſeaſe; that is, the nature of the ſoil, which is for the moſt part moſſy. This idea gains conſiderable ſtrength from obſerving the practice of the Lancaſhire planters, ſome of whom ſend their favourite kinds to the moſſy grounds to recover, after they have caught the diſtemper. The author of the W. Lothian Survey, who in the courſe of that work has diſplayed much *learning* and *ingenuity*, takes notice of the circumſtance of potatoes not being ſubject to the curl in the hilly and higher grounds. His expreſſion is (for we uſe his own words) "It is ſomewhat ſingular that this "diſtemper (the curl) is unknown in the higher diſtrict of the county, at "an altitude of 400 feet above the level of the ſea." He goes on to reaſon upon the probable cauſe of this difference, and ſeems to aſcribe it to the froſt ſetting in early in the ſeaſon in theſe elevated ſituations, and deſtroying the *haulm* of *the* potatoe before it is completely ripe. The inference he draws from thence is certainly a wrong one; for he ſeems to imagine, that in order to raiſe the beſt ſeed-potatoes, they ought to be taken up before they are ripe. Experience, however, contradicts this theory; for it is found that the more completely the bulbs or ſeeds of any plant are matured, the more perfect and productive will they be when they are put into the earth as ſeed. It is evident that the author has aſcribed that to altitude which is entirely owing to the nature of the ſoil; as it is now known, that, even in the loweſt ſituations, potatoes do not curl upon moſſy ſoils; while, on the contrary, the curl has lately begun to appear, even in the moſt elevated ſituations, where the lands are in good heart, and have been much manured with lime, or coal, or wood-aſhes *(c)*.

Great attention is paid in Lancaſhire to changing the ſeed, to prevent this diſtemper: a change from moſs-land, and *vice verſa*, is generally ſufficient *(d)*.

(b) Weſt Lothian, p. 81. *(c)* MS. Papers of the Board. *(d)* Lancaſter, p. 80.

Other Authorities.

The curl, aſſerted to be owing to forcing the plants from which the ſets are taken by manure or earthing *(d)*. Southern aſpect and rich land, bad. Do not curl on the mountains of Radnor and Montgomery (*e*).

Cauſed by ſowing the ſame ſorts too long on the ſame land *(ſ)*.

Potatoes procured from moſs (peat) land will not curl *(g)*.

Curl, owing to earthing *(h)*, and from chuſing the largeſt roots for ſets that were made large by earthing and hoeing *(i)*. Freſh dung greatly detrimental, and will cauſe the curl *(k)*.

In Yorkſhire, the moor-lands are at preſent in a manner free from it, while the vale is ſtill infeſted *(l)*.

It is a queſtion, whether the curl is not owing to being heated when kept, during winter, in the houſe; as when kept in pits, under ground, fewer of them are liable to that diſtemper *(m)*.

OBSERVATION.

The circumſtance of moſs or peat-earth being a preventative of the curl, is very curious, and much deſerves further enquiry. The experiments hitherto made, do not ſeem ſufficiently extended and accurate to admit of any certain concluſions.

ACCIDENTS.

Rooks.

Mr. Billingſley. Be particularly attentive to the rooks; who, by ſagacity of ſmell, find them out, and make great depredation (*n*).

(d) Society Tranſ. vol. 8. p. 21. *(e)* Ibid. p. 27. *(ſ)* Ibid. p. 32. *(g)* Ibid. p. 38.
(h) Vol. 9. p. 56. *(i)* Vol. 9. p. 60. *(k)* Vol. 11. p. 78.
(l) Marſhal, Yorkſhire, vol. 2. p. 52. *(m)* Selkirk Report, p. 30.
(n) Annals, vol. 21. p. 5.

CHAP VIII.

OF TAKING UP THE CROP.

Authorities from the Reports.

IN Herefordſhire, Mr. Yeald ploughs them up with a particular machine, having four prongs or barbs of iron with a fang, in the form of a double-mould-board, drawn by three horſes, or four oxen. It enters the ground under the bed of the potatoes, and throws the whole to the ſurface *(a)*.

In Northumberland, they are frequently taken up with the double-mould-board plough, by ſplitting the ridges in which they grow *(b)*.

In the North Riding, the one-bout ridges are ploughed, and the crop thereby laid bare *(c)*.

At Aveley, in Eſſex, the crops are dug with three-prong forks: expence forty ſhillings per acre *(d)*.

In Lancaſhire, generally dug with a three-prong fork *(e)*.

In the Iſle of Man, dug up with three-prong forks. A good hand gets up eight heaped buſhels in a day, without the aſſiſtance of a picker. *(f)*

Other Authorities.

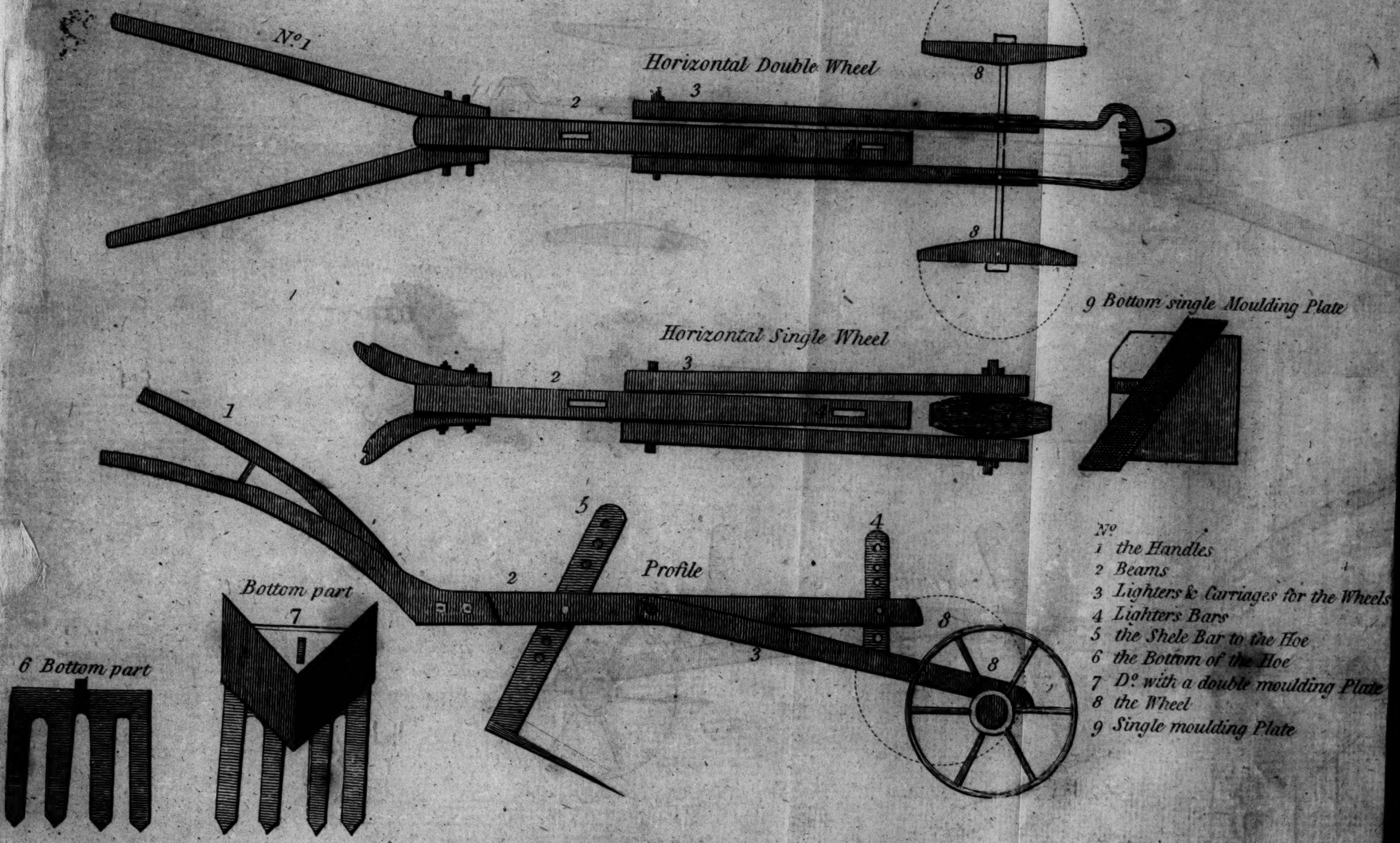
Mr. Buck, of Suffolk, ploughs up without a coulter, and neither the horſes nor the plough injure the roots *(g)*.

Mr. Young, in Suffolk, found a very great ſaving from the invention of a ſmall one-horſe harrow; which, by breaking the furrow after the plough has turned it, and is picked, expoſes all the reſt of the potatoes to be ſeen by pickers *(h)*.

In Yorkſhire, they formerly ploughed them up, but laid aſide that method, in favour of digging them up with dung-forks, which they found better *(i)*.

(a) Hereford, p. 64.
(b) Northumberland, p. 40.
(c) North Riding, p. 44.
(d) Eſſex, Vancouver.
(e) Lancaſter, p. 33.
(f) Iſle of Man, p. 36.
(g) Vol. 5, 7252 of Annals.
(h) Society Tranſ. vol. 4. p. 73.
(i) Marſhal York, vol. 2. p. 62.

Mr. YEALD'S MACHINES.



No.
1 the Handles
2 Beams
3 Lighters & Carriages for the Wheels
4 Lighters Bars
5 the Shele Bar to the Hoe
6 the Bottom of the Hoe
7 D.o with a double moulding Plate
8 the Wheel
9 Single moulding Plate

Scale One Inch to a Foot

Neele sculp.t 352 Strand

See P. 40.

In the Midland Counties, taken up with forks, at one penny to twopence per buſhel (k).

Mr. Dann digs them up by hand in October or November, at from one penny to two pence per buſhel, as the crop may be, more or leſs; at which price a man and his wife, on the average, earn three ſhillings and ſixpence per day. He believes they may be ploughed up cheaper than they can be dug; but prefers the latter (l).

CHAP. IX.

OF SECURING THE CROP.

Authorities from the Reports.

IN Suſſex, they build a houſe ten or twelve feet high, the walls ſix feet thick, of clay and ſtraw, over a hole four or five feet deep, in which they ſtore their crop (a).

In Lancaſhire, they ſecure them in heaps, in the ſhape of the roof of a houſe, covered cloſely with ſtraw ſix inches thick, and then covered with mould, cloſely compacted with the ſpade (b).

In Wiltſhire, they are ſecured in long narrow ridges of earth, with an intermediate covering of dry ſtraw; and this is found to preſerve them, if they are perfectly dry when pitted, during the ſevereſt froſts (c).

In the North Riding, they are gathered into heaps, laid upon the ſurface of the ground, and carefully covered with ſtraw. A deep trench is dug round cloſe to the heap; the earth out of which is beaten cloſe and tight upon the ſtraw, which makes it in general impenetrable to froſt or wet (d).

(k) Marſhal Mid Counties, vol. 1. p. 250.

(l) MS. Papers of the Board.

(a) Suſſex, p. 29.

(b) Lancaſter, p. 33.

(c) Wilts, p. 52.

In the Iſle of Man, ridged in heaps in the field; covered with ſtraw, packed cloſe ſix inches thick; then earthed from one to two feet thick, the graſs ſide of the ſod outwards, beat well with the back of a ſpade. Effectual againſt froſt or rain (e).

Other Authorities.

Mr. Turner, of Suffolk, tried a large wine vault; but too warm: they ſprouted (*f*).

General Murray, in Suſſex, digs holes in the ſide of a hill, ſix yards wide, ten feet deep, and of an indeterminate length; carts from the field unload at top, and they are taken out at that end at bottom, which opens to the ſlope of the hill, where a wall is built with a door. When full, a ſtack of ſtubble or ſtraw is built over the hole, wide and large enough for ſecurity againſt all froſts. In this manner the effluvia of the roots, riſing through the ſtubble, does not occaſion their rotting from heat (*g*).

Mr. Billingſley digs a trench eight inches deep and four feet broad; a thin layer of ſtraw at bottom and ſides; piles the potatoes in a roof form, four feet high; covers them with ſtraw ſix or eight inches thick; then earth a foot thick, and thatches over all. Keeps well in the ſevereſt froſts (*h*).

In the Midland Counties they preſerve them in ridges, and find that theſe ſhould not be more than four feet wide of potatoes. Some coal-aſhes ſifted over the mould, in finiſhing, preſerves them the better from the froſt (*i*).

OBSERVATION.

It is now very generally underſtood, that ridging is of theſe the beſt method, unleſs in certain caſes, where the ſlope of a hill is ſo well ſituated, and the ſoil ſo dry, as to make the Suſſex mode preferable.

(d) North Riding, p. 44. (e) Iſle of Man. p. 36. (f) Annals, vol. 1. p. 150.

(g) Annals, vol. 2. p. 284. (h) Vol. 21. p. 6.

(i) Marſhal, Midland Counties, vol. 1. p. 251.

CHAP. X.

EFFECT OF THE CULTURE IN AMELIORATING OR EXHAUSTING THE SOIL.

Authorities from the Reports.

THE culture of potatoes muſt certainly have a tendency to impoveriſh every eſtate on which it is practiſed. Dung too much laviſhed (*a*).

They find, in Cornwall, that they exhauſt in ſome degree like grain (*b*).

Mr. Crook, of Wiltſhire, ſows winter tares after them; having tried wheat, which did not anſwer. The crops were generally mildewed (*c*).

In Durham, ſow wheat after them. The crops good and clean (*d*).

Conſidered as an exhauſter in Somerſetſhire; particularly if wheat is the ſucceeding crop (*e*).

In Suſſex, the cultivators of this root are of opinion, that the wheat which follows it is equal to that of a clover lay, or a clean fallow (*f*).

In Weſtmoreland, they are found to exhauſt (*g*).

In the North Riding, they are, in the opinion of ſome, ſo exhauſting, that they ought not to be cultivated to a great extent; and there is a clauſe in leaſes reſtricting the farmer to an acre and a half (*h*).

In Berwickſhire, the farmers think them a very ſevere crop for the land; and therefore do not cultivate more than for mere family uſe (*i*).

If half the quantity of the produce be expended on the premiſes, by feeding cattle and ſheep, no exhauſtion of the ſoil need be apprehended (*k*).

Wheat after potatoes, on a light ſtony ſoil, generally unproductive (*l*).

In Dumfries, the land after potatoes is left, being both limed and dunged, in the higheſt heart, is fit to carry barley, wheat, or any thing elſe (*m*).

In Annandale, much wheat was ſown after potatoes; but the practice is

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(*a*) Cheſter, p. 20. (*b*) Cornwall, p. 40. (*c*) Crooke's MS. information.

(*d*) Durham, p. 70. (*e*) Somerſetſhire, p. 82. (*f*) Suſſex, p. 28.

(*g*) Weſtmoreland, p. 46. (*h*) North Riding, p. 44. (*i*) Berwick, p. 44.

(*k*) Cheſter, p. 20. Dann, MS. (*l*) Suſſex, p. 28. Dann, MS.

(*m*) Dumfries, App. p. 15.

much fallen off, having been found too ſevere for the ſoil. Barley found more advantageous (*n*).

In Mid Lothian, the Surinam enriches the ground little leſs than a crop of turnips itſelf. All potatoes excellent preparation for wheat (*o*).

In Tweedale, in fields part ſummer fallow, part turnip, part potatoes, and part peas, the crop of wheat or barley that ſucceeds, equal after all (*p*).

In Berwick, Surinam an excellent preparation for barley and graſs ſeeds (*q*).

In Ayrſhire, it is obſerved, that ſo far from exhauſting the land, potatoes, when luxuriant, are ſure to be ſucceeded by an abundant crop (*r*).

Other Authorities.

In Northumberland, a penalty of 10l. an acre is laid on the culture by many landlords, under the idea that they exhauſt (*s*).

Mr. Groſett, of Cornwall, is ſure, from experience, that they do not exhauſt; but as ſoon as he perceives the bloom entirely gone, he gathers all the ſeed-apples and gives them to hogs, who devour them greedily: this, he thinks, prevents exhauſtion (*t*).

Mr. Gilbert got good barley after them (*u*), in Suſſex.

Dr. Dann, of Kent, does not ſow wheat after them; having, on experience, found the ſoil left in too looſe a ſtate (*v*). They impoveriſh greatly (*x*). From twenty to thirty-five buſhels per acre of wheat gained after potatoes (*y*).

Mr. Buck, of Suffolk, planted two years ſucceſſively on the ſame land; the ſecond crop much more abundant than the firſt, and therefore thought they were not very exhauſting (*z*).

At Ryehope, near Sunderland, they reckon potatoes an excellent preparative for wheat, and have known five quarters per acre (*a*).

Mr. Hall, of Kent.—They exhauſt (*b*).

Mr. Billingſley, on great experience.—Avoid ſowing wheat after them; oats much better (*c*).

The editor of the Annals formed a comparative experiment of thirty-ſix

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(*n*) Dumfries, App. p. 15. (*o*) Mid. Lothian, p. 69. (*p*) Tweedale, p. 25.
(*q*) P. 131. (*r*) Ayrſhire, p. 25. (*s*) MS. Papers of the Board, Mr. Daviſon. (*t*) MS. information. (*u*) Annals, vol. 11. p. 214.
(*v*) Vol. 20. p. 233. Vol. 23. p. 384. (*x*) Dr. Hunter, Georgical Eſſays, vol. 2. p. 113.
(*y*) Annals, vol. 2. p. 8. (*z*) Ibid. vol. 5. p. 253. (*a*) Ibid. vol. 5. p. 263. (*b*) Ibid. vol. 10. p. 451.

courſes of crops, and found that the degree of exhauſtion of the ſoil was in proportion to the potatoes occurring in thoſe courſes *(d)*.

At Slaine, in Ireland, wheat is ſown after them, but generally a bad crop, and bad grain: barley good *(e)*.

In Suffolk, wheat found ſo bad after them, that there is no doubt of their exhauſting much *(f)*.

Mr. Hollins gained thirty buſhels of wheat after them *(g)*.

Mr. Barbor, had a better crop of wheat after them than ever ſeen in the neighbourhood *(h)*.

In France, many obſervations have been made, tending to prove that they do not exhauſt *(i)*.

Experiment in Scotland.—Half a large field carefully dreſſed and dunged, cropped with turnips, and the other half with potatoes; then barley and graſs ſeeds. The potatoe-half carried the beſt barley, and ſooneſt ripe; and the lay for two years the weightieſt crop *(k)*. N. B. Not ſaid whether the turnips were carted off.

In Ayrſhire, good wheat after them *(l)*.

In Edinburghſhire, wheat better after them than after oats *(m)*.

In Eaſt Lothian, found not to be an exhauſting crop *(n)*.

Sir James Grant had better barley after potatoes than after turnips *(o)*.

In Yorkſhire, opinions various; one party aſſerts, that they are great impoveriſhers of the ſoil; hurtful to corn, and ruinous to graſs. The other, that they are friendly to corn, and not enemies to graſs *(p)*.

Mr. Whyn Baker, ſowed barley after various preparations; the reſult as follows:

	Produce Barrels of Barley.		
	Bar.	ſt.	lb.
Red French Potatoes	18	9	2
Black ditto	16	4	8
White Munſter ditto	12	13	10
Flat Dutch Cabbage, drawn	13	2	4
Horſe Beans and Turnips, drawn	13	0	0
Red Cabbage, drawn	12	13	10
Vetches, for Hay and Turnips, drawn	12	11	6
Turnips, drawn	12	9	2 *(q)*

(d) Vol. 23. p. 505.

(e) Iriſh Tour, vol. 1. p. 27.

(f) Society Tranſ. vol. 4. p. 69, 82.

(g) Ibid. vol. 11. p. 80.

(h) Vol. 11. p. 92.

(i) Parmentier Traité de Pommes de Terre, p. 164.

(k) Wight, vol. 3. p. 5.

(l) Ibid. p. 191.

(m) Ibid. vol. 4. p. 450.

(n) Ibid. vol. 2. p. 153.

(o) Ibid. vol. 4. part 1. p. 384.

(p) Marſhal York, vol. 2. p. 64.

(q) Experiments reported to the Dublin Society, 1773, p. 83.

Mr. Dalton, of Yorkſhire, had a field part cabbages, drawn; part potatoes, both equally manured: and the next year the whole ſown with barley, which proved better by a quarter per acre after the potatoes than after the cabbages. One of his tenants planted an acre of potatoes in the middle of a field fallowed for turnips, all dunged, and the turnips fed by ſheep. The whole was ſown with oats; which crop was better after the potatoes by nine buſhels an acre (*r*).

Mr. Scroope, of Yorkſhire, has always good wheat after them (*s*).

At Goſworth, in Northumberland, better wheat and rye than common (*t*).

Near Morpeth, great crops of barley after them (*u*).

Mr. Dann conſiders potatoes as an exhauſting crop; that they exhauſt the ground more than any corn crop: but if cattle are fed with the produce, he conceives, with *a moderate quantity of litter*, they would produce dung ſufficient to manure nearly thrice the quantity of land the potatoes grow on; that is, on the ſuppoſition of his own average produce, 350 buſhels.

CULTURE COMPARED WITH THAT OF TURNIPS.

That of turnips more profitable (*v*).

Compared with turnips and cabbages, potatoes may be conſidered thus: They are more nutritious; and, in the opinion of thoſe who have uſed them, fatten cattle much quicker than either turnips or cabbages; being ſecured from froſt, are a more *certain* article of fattening than plants which are liable to periſh by alternate froſt and thaw. If turnips and cabbages outweather the ſeverities of winter, they occupy the ſoil in the ſpring when it is wanted to be prepared for the ſucceeding crop; while potatoes, if properly laid up, are ready without inconveniency till the graſs has a requiſite bite. Applying each plant to the proper ſoil, cabbages are beſt for ſtrong tenacious land; turnips for light ſhallow unproductive ſoils; and potatoes for rich, deep, ſound, ſandy loams (*w*).

(*r*) Young's North Tour, vol. 2. p. 340.
(*s*) Ibid. vol. 2. p. 370.
(*t*) Ibid. vol. 3. p. 15.
(*u*) Ibid. p. 21.
(*v*) Annals, vol. 21. p. 24.
(*w*) Marſhal, York, vol. 2. p. 66.

CHAP. XI.

OF THE PRODUCE.

IN Cheſhire, in the lazy-bed method, 300 buſhels per acre (*a*).

In Cornwall, by two crops on the ſame land, they produce 800 buſhels per acre (*b*).

In Cornwall, by paring and burning, 520 buſhels per acre (*c*).

In Cumberland, a fair average crop, 240 buſhels; the land a moſt excellent turnip ſoil (*d*).

In Durham, 250 buſhels; drilled at two feet ſix inches (*e*).

At Aveley, in Eſſex, 200 buſhels an acre; promiſcuous (*f*).

In the Iſle of Wight, produce, in drills at one foot, 255 buſhels an acre (*g*).

In Lancaſhire, the medium is 250 buſhels of 90 pounds, before they are cleaned (*h*).

In Nottinghamſhire, Mr. Bower, 345 buſhels per acre (*i*).

In Somerſetſhire, 330 buſhels, each 80 pounds (*k*).

In ditto, 160 ſacks, 240 pounds each per acre; average price five ſhillings per ſack (*l*).

Near Battel, in Suſſex, 375 buſhels. Land manured every ſecond year (*m*).

In Weſtmoreland, 300 buſhels per acre (*n*).

In Wiltſhire, from 50 to 160 ſacks, each 200 pounds (*o*).

From ſeven to 8000 tons of potatoes of the Kidney kind are annually exported from the banks of the Ouſe, in Yorkſhire, to the London market (*p*).

An ordinary crop of yams, in Scotland, is twelve tons per acre; but ſixteen tons are not an uncommon one (*q*).

Mr. Corbett, in Merionethſhire, raiſes immenſe crops of potatoes, to the value of 20l. per acre (*r*).

(*a*) Cheſter, p. 20.
(*b*) Cornwall, p. 38.
(*c*) Ibid. p. 38.
(*d*) Cumberland, p. 27.
(*e*) Durham, p. 70.
(*f*) Eſſex, Vancouver.
(*g*) Hants, 51.
(*h*) Lancaſter, p. 31.
(*i*) Nottinghamſhire, p. 13.
(*k*) Somerſetſhire, p. 82.
(*l*) Ibid. p. 139.
(*m*) Suſſex, p. 29.
(*n*) Weſtmoreland, p. 20.
(*o*) Wiltſhire, p. 52.
(*p*) W. Riding, p. 144.
(*q*) Flintſhire, p. 14.
(*r*) Merionethſhire, p. 13.

In the Iſle of Man, 180 buſhels per acre; with extraordinary care, 300 (s).

Mr. Hales, near Hull, had a crop which, at one ſhilling a buſhel, amounted to 25l. per acre, or 500 buſhels (t).

In Forfarſhire, produce 55 bolls, each 16 ſtone, equal to 164 buſhels the Engliſh acre (u).

In Galloway, an acre in the lazy-bed method produces 35,000 weight: this is 466 buſhels of 75 pounds, or 373 buſhels per Engliſh acre (v).

In the Iſle of Harris, produce nine for one of the ſeed in the lazy-bed method (w).

In Dumfriesſhire, 200 pecks, of ſix ſtone and a half each from an acre, is looked upon as a very ordinary crop. Sir James Kirkpatrick has had upwards of 330 pecks, which, at the medium price of one ſhilling, is 16l. 10s. per acre (x).

In Annandale, a Scotch acre, drilled, produces 200 Wincheſter buſhels, or about ſeven tons of clean potatoes (y).

In Mid Lothian, there are from 12 to 1500 acres, average produce 30 bolls, each 28 ſtone (z), equal to 190 buſhels, at 75 pounds, or 152 buſhels per Engliſh acre.

In Mid Lothian, the Surinam, called there Yams, produce commonly twelve tons an acre. The Red ſort yields more than the White (a).

In Weſt Lothian, a field has produced in the upland parts from 100 to 130 bolls the acre, Linlithgow barley meaſure (b); but in other parts 60 bolls.

In Eaſt Lothian, produce in the high country 60 bolls; on the beſt lands in the low diſtrict rarely more than 40 or 50 barley meaſure (c); 60 bolls, or 367 buſhels, or per Engliſh acre 294.

In Eaſt Lothian, Surinam potatoes produce 70 bolls, at four ſhillings per boll, or 14l. (d).

In Roxburghſhire, Baron Rutherford, from two to 300 firlots barley meaſure, at one ſhilling the firlot; in rich ſoils, ſometimes 400 firlots. One acre in 1793, manured with twenty-four ton of dung, which coſt ſeven pounds, ſold for 21l. (e).

In Selkirkſhire, produce 25 bolls (f).

In Tweedale, 50 bolls per acre (g). Alſo from 20 to 30.

(s) Iſle of Man, p. 36.

(t) Suſſex, p. 29. MS.

(u) Forfar, p. 14.

(v) Galloway, p. 6.

(w) Hebrides, p. 18.

(x) Dumfries, App. 17.

(y) Ibid. p. 29.

(z) Mid Lothian, p. 67.

(a) Ibid. p. 69.

(b) Weſt Lothian, p. 25.

(c) Eaſt Lothian, p. 81.

(d) Ibid. p. 83.

(e) Roxburghſhire, p. 33.

(f) Selkirk, p. 30.

(g) Tweedale, p. 15.

Mr. Hill, in Hertfordſhire, 400 buſhels per acre, 1793, at one ſhilling and nine pence per buſhel, 35l. Expence 5l. Profit 30l. (*b*).

In Ayrſhire, crops not unfrequently amount to the value of 16l. or 20l. an acre (*i*).

In the county of Cromarty, produce 16 to 20 bolls (*k*), on the beſt conducted farms.

Other Authorities.

450 buſhels per acre gained, at 2½d. per buſhel (*l*), of the Cluſter ſort.

At Ilford, 1784, crops eight to 15 tons per acre, at 12 or 14 inches ſquare (*m*), at 10 tons an acre, coſt to the farmer in his barn 30s. per ton; at 7½ tons, 40s. per ton; 10 tons are 298 buſhels, conſequently one ſhilling per buſhel prime coſt (*n*).

Mr. Mure, in Suffolk, in a plantation, 536 buſhels of the Cluſter (*o*).

Mr. Turner, in Suffolk, Red Cluſter, 364 buſhels; White Cluſter, 415.

Mr. Kirby, in Suffolk, Globe White, 400 buſhels on old lay; no manure (*p*).

Mr. Bywell, of Yorkſhire, 360 buſhels (*q*).

Mr. Leblanc, in Suffolk, on a trenched ſainfoin lay, on a blowing ſand, in a wet ſeaſon, 401 buſhels (*r*).

At Ryefield, near Sunderland, in drills, produce 180 buſhels (*s*).

Mr. Le Blanc, in Suffolk, broke up ſainfoin, five years old, on a blowing ſand, ploughed deep, and planted every ſecond furrow with the Cluſter potatoe; produce 324 buſhels per acre (*t*).

Mr. Pitt, of Staffordſhire, 300 buſhels, prime coſt 7¾d. of 80 pounds weight. 225 buſhels, prime coſt 7d. In a third, 225, prime coſt 7d. (*u*). Mr. Abdy, on freſh woodland, dunged, 563 buſhels. On good land, dunged, 640 (*v*).

Mr. Hall, of Kent, 275 ſacks, or 825 buſhels, or 25 tons of the Cluſter on land that had been a hop-ground 14 years; and alſo dunged 60 loads an acre (*w*).

Mr. Gilbert, in Suſſex, 400 buſhels. Mr. Cavalier, 700 buſhels, on old hop-ground (*x*).

(*h*) Herts, p. 27. (*i*) Ayrſhire, p. 26. (*k*) Rep. Northern Counties of Scotland, p. 81.

(*l*) Annals, vol. 2. p. 8. (*m*) Vol. 2. p. 99. (*n*) Annals, vol. 2. p. 100.

(*o*) Ibid. vol. 1. p. 127. (*p*) Ibid. p. 285. (*q*) Ibid. p. 402.

(*r*) Ibid. vol. 3. p. 84. (*s*) Ibid. vol. 5. p. 363. (*t*) Ibid. vol. 5. p. 258.

(*u*) Ibid. vol. 7. p. 38. (*v*) Ibid. vol. 10. p. 328. (*w*) Vol. 10. p. 451.

(*x*) Ibid. vol. 11. p. 243.

Mr. Mayo, of Suſſex, has had 600 buſhels of the Cluſter; but 450 average (*y*).

Mr. Fuller, of Suſſex, 400 to 450 buſhels of the Golden Globe (*z*).

Mr. Eccleſton, of Lancaſhire, 350 buſhels an acre (*a*).

Mr. Dann, of Kent, in 1791, found that the prime coſt of his potatoes was 8½d. per buſhel, of 73 pounds (*b*).

Mr. Tooſy, in Canada, 350 buſhels an acre (*c*).

Mr. May, of Suffolk, on a blowing ſand, without dung, 150 to 200 buſhels (*d*) of Ox-Noble.

Mr. Dann, of Kent, planted nine acres three roods and twenty poles, at the expence of 79l. 7s. 2d.; produce 3732 buſhels, which is 5¼d. per buſhel (*e*). Next year, the ſame gentleman gained 450 buſhels, on an average, of twenty-three acres (*f*). In 1791, 4928 buſhels coſt him 8½d. per buſhel (*g*).

Mr. Broadbent, of Surry, 600 buſhels (*h*).

Mr. Billingſley, average 70 ſacks, each 240 pounds, on 301 acres; or 20,924 ſacks, prime coſt 2s. 9d. the ſack (*i*).

Mr. Mordaunt, 225 buſhels per acre, Surinam without manure; middling black ſandy ſoil (*k*).

Mr. Dann, of Kent, in 1793, had 28½ acres, prime coſt 5½d. per buſhel (*l*).

Produce in Middleſex, 300 buſhels (*m*).

Mr. Woolward, in Suffolk, 240 buſhels, in drills (*n*).

At Dolleſton, in Ireland, lazy-beds, ſixty barrels prime coſt 5s. or 1s. 3d. per buſhel (*o*).

At Slaine, in Ireland, in lazy-beds, 4s. per barrel prime coſt (*p*).

At Packenham, in Ireland, in lazy-beds, prime coſt 2s. 6d. per barrel (*q*).

At Athy, in Ireland, crop eighty barrels, prime coſt 2s. 2d. per barrel (*r*).

At Leſliehill, in Ireland, crop 320 buſhels, prime coſt 5½d. per buſhel (*s*).

Near the Giants Cauſeway, 259 buſhels per Engliſh acre, prime coſt 6¼d. (*t*).

At Caſtle Oliver, in the County of Limerick, 900 buſhels per acre have been gained (*u*).

(*y*) Annals, vol. 11. p. 249.
(*z*) Ibid. vol. 12. p. 267.
(*a*) Vol. 16. p. 357.
(*b*) Vol. 17. p. 226.
(*c*) Vol. 17. p. 284.
(*d*) Vol. 18. p. 314.
(*e*) Vol. 19. p. 55.
(*f*) Vol. 20. p. 232.
(*g*) Vol. 20. p. 233.
(*h*) Vol. 19. p. 430.
(*i*) Vol. 21. p. 36.
(*k*) Vol. 21. p. 521.
(*l*) Vol. 22. p. 166.
(*m*) Vol. 22. p. 58.
(*n*) Vol. 23. p. 32.
(*o*) Iriſh Tour, vol. 1. p. 10.
(*p*) Vol. 1. p. 27.
(*q*) Vol. 1. p. 50.
(*r*) Vol. 1. p. 68.
(*s*) Vol. 1. p. 183.
(*t*) Vol. 1. p. 116.
(*u*) Vol. 1. p. 490.

Mr. Young, in various fields of many acres, the Cluſter,
360 buſhels
328 ditto
390 ditto
277 ditto
150 ditto
550 ditto
422 ditto
350 ditto
356 ditto
224 ditto
250 ditto

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Average 332 buſhels per acre (*v*).

Mr. Preſgrave, of Lincolnſhire, on a moory fen ſoil, 10s. an acre, no manure, 250 buſhels (*w*).

Mr. Bucknell, of Devonſhire, 480 buſhels (*x*).

Mr. Barbor, by fattening oxen, made 200l. by twenty acres (*y*).

In France, the ſame breadth of land which produces thirty boiſeau of wheat, will produce 300 boiſeau of potatoes (*z*).

Mean produce in France, fifty or ſixty ſeptiers per arpent (*a*).

In Dumbartonſhire, ſixty bolls from ſixteen and an half of ſeed, on a Scotch acre (*b*).

In Fifeſhire, drills eighteen inches, ſeventy bolls of twenty-two ſtone Amſterdam (*c*), or 272 buſhels per Engliſh acre.

In Forfar, potatoes have been ſold at 25l. an acre (*d*). In the ſame county, forty bolls an acre a good crop (*e*).

In Peebleſſhire, Mr. Wightman, 108 bolls (*f*).

Sir James Grant, thirty-five bolls of thirty-two ſtone (*g*).

Mr. Greenhill, of Eſſex, whoſe father has had 300 acres in a year, and himſelf 200, has above fixteen tons per acre, but a great crop; when ſo large, it is difficult to ſell them; has ſold the beſt at 30s. a ton on ſuch occaſions (*h*).

(*v*) Society Tranſ. vol. 3 and 4.
(*w*) Ibid. vol. 8. p. 51.
(*x*) Ibid. vol. 9. p. 49.
(*y*) Vol. 11. p. 95.
(*z*) Parmentier Traité de Pommes de Terre, p. 13.
(*a*) Ibid. p. 156.
(*b*) Wight, vol. 3. p. 303.
(*c*) Ibid. vol. 1. p. 258.
(*d*) P. 312.
(*e*) P. 369.
(*f*) Vol. 2. p. 478.
(*g*) Vol. 4. part 1. p. 383.
(*h*) MS. information papers of the Board.

In the Midland Counties, 600 buſhels an acre have been produced; 3 to 400 a fair good crop (*i*).

Mr. Wright, in Norfolk, 364 buſhels (*k*). A gentleman in Wiltſhire, with dunging and folding, 480 buſhels (*l*).

Near Bath, 440 buſhels (*m*).

Sir Thomas Beevor, White Champions, 346 buſhels (*n*).

Mr. Whimpey, 375 buſhels, in drills (*o*). Ditto, about 200 (*p*).

Mr. Chapple, 300 (*q*). At Sandy, in Bedfordſhire, 250 (*r*).

Mr. Dalton, of Yorkſhire, drilled 150 buſhels (*s*). Mr. Scroope, of Yorkſhire, drilled 216 buſhels (*t*).

Near Morpeth, in Northumberland, at a foot ſquare, 226 buſhels (*u*); alſo 350 ditto (*v*).

At Glenwelt, in the ſame county, at a foot ſquare, 220 buſhels (*w*).

At Keſwick, every other furrow, 300 (*x*).

Knutsford, in Cheſhire, graſs-land dug, dibbled at one foot every way, 500 buſhels (*y*).

About Doncaſter, 250; near Hull, 180; near Newcaſtle, 226; Alnwick, 150; Carliſle, 300; Burton, 180; Kabers, 150; Garſlang, dug and dibbled at nine inches, 380; Ormſkirk, 150; Altringham, dug and dibbled, 709; Stone, graſs-land manured well, dug and dibbled, 450; Shenſtone, the ſame culture, 400; Birmingham, the ſame, 550; Bendſworth, dibbled one foot ſquare, 350 (*z*).

Mr. Kendal, in Derbyſhire, 600 buſhels; about Caſtleton, 400; about Cheſterfield, 300; Mr. Wharton, Doncaſter, 375, on rich ſand at 50s. an acre; Mr. Cook, at Wheatley, 195; Mr. Arbuthnot, Surry, 136; Mr. Taylor, of Bifrons, 400; Mr. Poole, of Suſſex, 633; Mr. Sturt, Dorſetſhire, 600; at Glaſtonbury, 544 (*a*).

Mr. Townley, of Belfield, in Lancaſhire, from an acre and half, ſtatute-meaſure, had 34l. at 1s. 3d. per buſhel; beſides what was eaten by a large family, and ſets for two acres (*b*).

OBSERVATION.

From authorities ſo exceedingly numerous, it does not ſeem to be neceſſary to draw a general average: the variations are ſo great, that it would,

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(*i*) Marſhal, Mid. Counties, vol. 1. p. 252. (*k*) Bath Society, vol. 1. p. 31.
(*l*) Ibid. vol. 2. p. 69. (*m*) Ibid. vol. 2. p. 356. (*n*) Ibid. vol. 3. p. 282.
(*o*) Ibid. vol. 5. p. 30. (*p*) Ibid. vol. 6. (*q*) Vol. 7. p. 351.
(*r*) Young's North Tour, vol. 1. p. 54. (*s*) Ibid. vol. 2. p. 339.
(*t*) Ibid. p. 370. (*u*) Ibid. vol. 3. p. 14. (*v*) P. 20. (*w*) Ibid. p. 84.
(*x*) P. 108. (*y*) Ibid. p. 243. (*z*) All theſe alſo from Young's North Tour.
(*a*) All theſe from Young's Eaſtern Tour, vol. 4. p. 113. (*b*) Hunter's Georgical Eſſays, vol. 4. p. 24.

with ſuch a view, be proper to claſs them according to ſoil and management; in which attempts there would be difficulties too great to remove from the imperfections and omiſſions in many of the experiments, or their regiſters. One general reſult may, however, be deduced; which is, that the crops are upon the whole very abundant, and offer great encouragement to thoſe who may be inclined to enter into or extend the cultivation.

CHAP. XII.

OF THE VALUE OF POTATOES.

UNDER this Head may be conſidered the Application and Value.

1. By Cattle.
2. By Hogs.
3. By Sheep.
4. By Horſes.
5. By Poultry.

SECTION I.

BY CATTLE.

DR. WILKINSON, of Enfield, in feeding cows on them, found that when they eat nothing elſe, the milk was too thin and watery to fatten calves; and the butter white and taſteleſs, without any firmneſs: good when they ate hay alſo (*a*).

(*a*) Annals, vol. 20. p. 458.

In Frodſham, in Cheſhire, where 100,000 buſhels are annually raiſed, when the price is ſo low as one ſhilling per buſhel, of 90 pounds, conſiderable quantities are given to fatten cattle, milch cows, horſes, and hogs with great ſucceſs; but are found to be of too laxative a nature, without an addition of ſome other food (*b*).

In Cumberland, Mr. Blaylock feeds his cows with potatoes: 120 buſhels with ſixteen ſtone of oatmeal; will feed a cow for three months, and leave a profit of 3l. or 4l. (*c*).

		£.	*s.*
16 ſtone of oatmeal, at 2s.	—	1	12
120 buſhels of potatoes, at 4d.	—	2	0
Profit of a cow	—	£. 3	12

Mr. Lamb, of Cumberland, has been long convinced, that an acre of potatoes is of leſs value than an acre of turnips for feeding cattle; and ſays, that the practice of ſo applying them is every year loſing ground; but they value their turnips at 5l. an acre for feeding cattle (*d*).

At Aveley, in Eſſex, ſteaming potatoes for fattening bullocks, has anſwered well, when mixed with about twice the bulk of cut ſtraw and hay (*e*).

In Lancaſhire they are almoſt univerſally boiled in ſteam, in a large hamper or tub, perforated and placed over the water, and given to cattle, either warm or cold, mixed with chaff, bran, hay-ſeeds, barley, or oatmeal (*f*).

Mr. Bower, of Nottinghamſhire, would feed with potatoes at 2s. a ſack (*g*).

Mr. Billingſley, of Somerſetſhire, found by experiment that potatoes thus applied could not be carried further than the value of 10d. the buſhel, of eighty pounds. (*h*).

In Suſſex, they fatten bullocks with them with great ſucceſs (*i*).

In Dumbarton, cows are fed with meſſes of boiled food; potatoes a principal ingredient, but not boiled; only bruiſed in a ſtone mortar (*k*).

In Mid Lothian, the Surinam chiefly given to milch cows; increaſing the produce without affecting the taſte of the milk (*l*).

The Surinam, in Weſt Lothian, have killed many cattle by hoving. A cure which rarely fails if given before the animal falls down, is a full

(*b*) Cheſter, p. 19.
(*c*) Cumberland, p. 26.
(*d*) Ibid. p. 27.
(*e*) Eſſex, Vancouver.
(*f*) Lancaſter, p. 34.
(*g*) Nottingham, p. 13.
(*h*) Somerſet, p. 82.
(*i*) Suſſex, p. 28.
(*k*) Dumbarton, p. 61.
(*l*) Mid Lothian, p. 69.

Scotch pint of water, with as much common ſalt in it as can ſpeedily be diſſolved. Operates as an emetic (*m*).

Mr. Hill, in Hertfordſhire, feeds his milch cows with potatoes: give abundance of milk, but not cream in proportion (*n*).

In Warwickſhire, potatoes for cattle gaining ground (*o*).

Other Authorities.

An ox of 140 ſtone (eight pounds) will eat one buſhel and a half per day; from 80 to 100 ſtone, one buſhel with about ten pounds of hay (*p*).

Mr. Bywell, of Yorkſhire; oxen of 70 or 80 ſtone (fourteen pounds) a buſhel a day, with ſome hay, are ſuperior to turnips (*q*)

Mr. Campbell found that large oxen may be as completely, and to as high a degree, fattened on potatoes and hay as on any other food; and the beef remarkably good (*r*).

Mr. Fuller, of Suſſex, has fattened many ſheep on them (*s*).

The Editor of the Annals, in Suffolk, finiſhed fattening oxen with potatoes, with the addition of ſome bean-meal, from April 21 to May 27, and they did perfectly well (*t*).

Mr. Dann, of Kent, after fattening many beaſts on this root, dropt the practice in 1794, finding that it did not anſwer (*u*).

Mr. Turner, in Suſſex.—The water in which they are boiled deleterious to cattle (*v*).

Mr. Rowley, of Ireland, has fattened worked oxen of five years old on them par-boiled, hay beſides; fattened remarkably quick (*w*).

Mr. Abdy, of Eſſex, fattened Welch runts on potatoes, and they paid 5½d per buſhel. A Scotch cow alſo, and paid 1s. 4d. per buſhel (*x*); but fifth quarter included, rejecting that the value is 1s. 1d.

Mr. Clutton, in Suſſex, has fattened many oxen on potatoes, and found them to pay from 6d. to 9d. per buſhel (*y*).

Mr. Davis, &c. in Suſſex, found them in fattening and feeding cattle worth 6d. per buſhel (*z*).

Mr. Gilbert, of Suſſex, found them worth 5d. in fattening oxen (*a*).

Mr. Mayo, of Suſſex, has fattened oxen on the Cluſter ſort for ſixteen years, and the value aſcertained to be 4d. per buſhel (*b*).

(*m*) Weſt Lothian, p. 26.

(*n*) Herts, 28.

(*o*) Warwick, p. 45.

(*p*) Annals, vol. 2. p. 8.

(*q*) Ibid. vol. 1. p. 402.

(*r*) Ibid. vol. 11. p. 109.

(*s*) Ibid. p. 250.

(*t*) Ibid. vol. 12. p. 233.

(*u*) Ibid. vol. 23. p. 384.

(*v*) Ibid. vol. 20. p. 288.

(*w*) Iriſh Tour, vol. 1. p. 23.

(*x*) Annals, vol. 10. p. 328.

(*y*) Ibid. vol. 11. p. 190.

(*z*) Ibid. p. 223.

(*a*) Ibid. p. 243.

(*b*) Ibid. p. 251.

Mr. Campbell, of Kent, would not ſell potatoes at 9d. per buſhel, if beef ſold at 4½d. per pound. (*c*).

The Editor of the Annals, in fattening eight bullocks, tried them with 212 buſhels of Cluſter potatoes, giving ſome bean-meal and chaff at the ſame time; and the potatoes did not pay 1½d. per buſhel; 70 buſhels more were given to loſs (*d*): and the following year the reſult was the ſame (loſs) in finiſhing twelve beaſts (*e*).

Mr. Mure, of Suffolk, fattening beaſts on a very large ſcale, found that twenty-four oxen feeding twenty weeks on potatoes, with ſome beans and chaff added, gained each 212 pounds live weight; that is, dead 116; and at 4½d. per pound 2l. 3s. 4d. or 2s. 2d. per week. Alſo thirty oxen in eleven weeks, fed on potatoes, with ſome malted beans and hay added, gained each 119 pounds live weight, dead ſixty-five pounds; at 4½d. 1l. 4s. 4d. or 2s 2d. per week. Alſo forty oxen, fed on potatoes, with ſome beans, chaff, and hay added, in ſixteen weeks gained each ninety-two pounds live weight, dead fifty-one pounds; at 4½d. is 19s. 1d. or per week 1s. 2d. Alſo one bull, fed in the ſame way, hay excepted, gained in twenty-four weeks 672 pounds, or dead 369 pounds; and at 4½d. is 6l. 18s. or per week 5s. 8d. Alſo two bulls, fed in the ſame way, twenty-one weeks, each gained 420 pounds alive, or 221 pounds dead; which at 4½d. is 4l. 6s. or 4s. per week. Alſo two bulls twenty weeks, that gained each 196 pounds alive, or 107 dead; which at 4½d. is 2l. or 2s. per week. Alſo four bulls twenty weeks, that gained each 210 pounds alive, or 115 pounds dead, which at 4½d. is 2l. 2s. or 2s. 1d. per week (*f*): all theſe fed in the ſame manner, beans and chaff added to potatoes. There can be no doubt but the beans, chaff, and hay eaten amounted to more than the value paid by theſe beaſts, and conſequently that the potatoes, to the amount of many thouſand buſhels, were entirely thrown away. The beaſts had half a peck of beans per day; conſequently coſt, beſides chaff and hay, 3s. per week. In another experiment, potatoes paid 6d. per buſhel, but nothing noted for hay. In another, eight beaſts in forty-two days ate forty-eight buſhels of potatoes, beſides beans and chaff, 1s. 8d. per week, gained ninety-ſix pounds live weight, dead fifty-two pounds; which at 4½d. is 19s. or 3s. 2d. per week: deduct 1s. 8d. remains 1s. 6d. for eight buſhels of potatoes, or 2½d. per buſhel (*g*).

Mr. Dann, of Kent, fattened fourteen beaſts on potatoes and clover-hay, which paid 6d. per buſhel (*h*).

The Editor of the Annals gave, for three weeks, potatoes, beans, and hay to ſix beaſts that were fattening; they gained 2l. 11s. 3d.; beans and hay

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(*c*) Annals, vol. 12. p. 296. (*d*) Ibid. vol. 14. p. 143. (*e*) Ibid. vol. 16. p. 73.

(*f*) Ibid. p. 90. (*g*) Ibid. p. 94. (*h*) Ibid. p. 308.

2l. 0s. 6d.; remained for 126 buſhels of potatoes 10s. 9d. or 1d. per buſhel (*i*).

M. Dann, of Kent, fed ſeventeen bullocks on potatoes; they ate each a buſhel and a half per day, and eight pounds of hay; and paid 6d. per buſhel for the potatoes (*k*).

Mr. Hunter, of Hertfordſhire, fed 103 oxen on potatoes; and found they did well with hay, but not without (*l*).

Mr. Bucknell, of Devon, found it better to give them dry, though dirty, to cattle, than waſhed: if too much earth, ſhake them in an iron ſieve (*m*).

Mr. Greenhill, of Eaſt Ham, aſſerts, that watery and other potatoes are not near ſo nouriſhing for cattle as mealy (*n*).

The ſame perſon deſcribes Mr. Crooke's method, by which three ſteaming tubs, with copper bottoms, ſteam twenty-five ſacks a day, which feeds forty-ſeven oxen, thirty-five cows and young oxen, ſix yearlings, fifteen horſes, and thirty hogs. Five men prepare the potatoes, and ſerve the cattle (*o*).

Mr. Dann, of Kent, by fattening ſeventeen oxen, 6d. per buſhel, of ſeventy-three pounds (*p*).

SECTION II.

BY HOGS.

Authorities from the Reports.

IN Cumberland, applied to feeding ſwine; thirty buſhels of potatoes and ten of corn, made into meal, will feed a ſow of eighteen or twenty ſtone weight, and leave a profit of 1l. 15s. The potatoes are boiled, and meal mixed with them (*a*).

	£.	s.
Ten buſhels of corn, at 2s. — —	1	0
Fire, attendance, &c. — —	0	5
Thirty buſhels of potatoes, at 4d. —	0	10
Profit by ſwine —	£. 1	15

(*i*) Annals, vol. 18. p. 89. (*k*) Ibid. vol. 19. p. 56.

(*l*) Society Tranſ. vol. 10. p. 98. (*m*) Vol. 9. p. 47. (*n*) MS. Papers of the Board.

(*o*) Annals, vol. 22. p. 42. (*p*) Society Tranſ. vol. 10. p. 85. (*a*) Cumberland, p. 27.

Mr. Billingſley, of Somerſetſhire, in a ſeries of the moſt conſiderable experiments yet publiſhed on fattening hogs, found the value of the potatoes ſo applied could not be made to exceed 10d. the buſhel, of eighty pounds (*b*).

In Roxburgh, pork fattened with potatoes, not ſo ſweet and firm as that fattened with grain (*c*).

Other Authorities.

Mr. Le Blanc, of Suffolk, had thirteen ſows and litters of pigs at once; a ſtock, he obſerves, that he ſhould not think of keeping, if he had not grown potatoes (*d*).

Mr. Pitt, of Pendeford, fattened hogs with potatoes boiled and thickened with barley-meal; and they paid from 9*d*. to 1s. per buſhel (*e*).

Mr. Billingſley found, in very conſiderable experiments, that the water in which potatoes were boiled was injurious to hogs: the roots better eaten when ſlightly boiled than when boiled to a pulp (*f*).

At Slaine, in Ireland, for hogs boil and mix with bran and oats at laſt; a hog of 2 cwt. will fatten in two months on ſix barrels, and one barrel of oats. Much poultry reared and fed on them in all the cabins (*g*).

Near Dublin, fatten hogs to fine bacon; but give butter-milk a week or two before killing. Give ſome offal-corn for fowls, boil them to a maſh, and mix with butter-milk, and they fatten exceedingly well (*h*).

Mr. Greenhill, of Eaſt Ham, ſays, that hogs will not touch the apples (*i*).

Cluſter ſort, 3½d. ditto, by fattening hogs in a conſiderable experiment, by Mr. Mure (*k*).

Mr. Turner, in Suffolk, by hogs, 6d. per buſhel; valuation from obſervation not abſolute (*l*).

Mr. Billingſley applied 16,778 ſacks, each 240 pounds, to fattening and feeding hogs, and they paid 2s. 6d. per ſack, or 10d. per buſhel, of eighty pounds: intereſt of capital in feeding not reckoned, and the value of the dung made included (*m*).

Mr. Young aſcertained the value of Cluſter potatoes in various experiments. For (*n*).

	per buſhel.	
Fattening Chineſe hogs —	1s. 0d.	Average 8¼d.
Ditto other hogs —	5¼d.	
Ditto — —	9d.	
Ditto Chineſe —	11½d.	
By lean hogs, eſtimated	9d.	
By hogs (*o*). — —	4d.	

(*b*) Somerſet, p. 82. (*c*) Roxburgh, p. 64. (*d*) Annals, vol. 2. p. 8.

(*e*) Ibid. vol. 6. p. 231. (*f*) Ibid. vol. 21. p. 458. (*g*) Iriſh Tour, vol. 1. p. 27.

(*h*) Vol. 1. p. 7. (*i*) MS. Papers of the Board. (*k*) Annals, vol. 1. p. 127.

(*l*) Ibid. p. 192. (*m*) Vol. 21. p. 51. (*n*) Society Tranſ. vol. 3. p. 46 to 90.

(*o*) Ibid. vol. 4. p. 79.

Mr. Winter, by fattening hogs, 2d. per buſhel (*m*). Surinam, a half penny per buſhel (*n*).

Mr. Boys, of Kent, in a conſiderable experiment, found that ninety-ſix ſacks of potatoes, given to fatten hogs, were 4l. 3s. 1d. worſe than nothing. He had doubled their uſe from many obſervations (*o*).

Mr. Pitt, of Pendeford, Staffordſhire, fed large ſwine on boiled potatoes, in this method: On taking them hot from the furnace, they are in maſhing mixed with bran and barley-meal; twelve pounds and an half of the latter to one buſhel of potatoes: afterwards gave peaſe. They paid 5d. per buſhel for the potatoes; but this was better than Mr. Pitt had ever before obſerved (*p*).

Mr. Le Blanc, in Suffolk. Given raw to hogs in the farm-yard, and they throve well (*q*).

Boiled, they fatten both porkers and bacon exceedingly well; but oats given for three weeks at laſt (*r*).

Great numbers of hogs fattened entirely on them, and the pork much firmer than pollard fed. Reckoned a very profitable application (*s*).

All the hogs in the county of Meath fattened on them, half boiled (*t*).

In the county of Sligo, if fattened on them raw, the fat is bad; but par-boiled, and well ſprinkled with ſalt, firm and good (*u*).

In Scotland, for fattening hogs, boiled and mixed with meal of any ſort, for five weeks before killing; and meal entirely for a few days. Alſo geeſe fed to good account (*v*).

Mr. Kendal, of Derbyſhire, mixes two buſhels of rye-meal with twenty of boiled potatoes; with which he fattens brawns better than on corn alone. Mr. Wharton, of Doncaſter, mixes half a peck of barley-meal with ſix buſhels of potatoes boiled; with which he fattens porkers, and half fattens bacon hogs. Mr. Arbuthnot fattens porkers, mixed with a little barley-meal. Mr. Poole, of Suſſex, boiled one-third barley-meal, and two-thirds potatoes and beat peaſe and barley alone (*w*).

(*m*) Bath Society, vol. 3. p. 331

(*n*) Annals, vol. 7. p. 558.

(*o*) Ibid. vol. 9. p. 98.

(*p*) Annals, vol. 9.

(*q*) Ibid. vol. 3. p. 83.

(*r*) Young's Iriſh Tour, vol. 1. p. 10.

(*s*) Ibid. p. 29.

(*t*) Ibid. p. 45.

(*u*) Ibid. p. 291.

(*v*) Wight, vol. 2. p. 430.

(*w*) All theſe from Young's Eaſtern Tour, vol. 4. p. 113.

SECTION III.

BY SHEEP.

MR. FULLER, of Suſſex, has fattened many ſheep on potatoes (*a*).

General Murray, in Suſſex, fattens ſheep with them; 196 wethers eat every day fourteen buſhels of potatoes and 1 cwt. of hay (*b*).

Mr. Fuller, of Suſſex, fattens ſheep with potatoes with great ſucceſs, and faſter than on corn, or even oil-cakes; each ſheep eats a gallon a day, and ſome hay morning and evening (*c*).

Mr. Cretté de Palleul fattened ſixteen ſheep; four on potatoes, four on turnips, four on beets, and four on corn; the four on potatoes gained in four months ſeventy pounds, on turnips ſixty-ſeven and an half, on beets ſeventy-one, on corn ninety-two and an half; they had ſome hay. All the weights alive (*d*).

Mr. Armſtrong, of Ireland, had eighty ſheep which in the ſnow got to his potatoes; and eating them freely, he drew off forty, and put them to that food regularly: they fattened very quick, much ſooner than forty others at hay, and yielded a great price (*e*).

Mr. Dann, 156 ewes, and 155 lambs, fed on potatoes; ate 616 pounds, and 279 pounds of hay each day (*f*).

Mr. Bucknell, of Devonſhire, found it better to give them dry, though dirty, to ſheep than waſhed (*g*).

Mr. Ward, of Berkſhire, prepared potatoes and turnips for lambs. An acre of middling turnips kept forty lambs twenty days: 100 buſhels of potatoes kept them the ſame time. If they ſcour, a little hay is given (*b*).

(*a*) Annals, vol. 11. p. 250.

(*b*) Ibid. p. 285.

(*c*) Ibid. vol. 12. p. 266.

(*d*) Ibid. vol. 14. p. 139.

(*e*) Iriſh Tour, vol. 1. p. 22.

(*f*) Society Tranſ. vol. 10. p. 94.

(*g*) Ibid. 9. p. 47.

(*h*) Annals, vol. 11. p. 625.

SECTION IV.

BY HORSES.

Authorities from the Reports.

MR. CROOK, of Tytherton, North Wiltſhire, ſteams in this manner: He fits a veſſel which contains one or two buſhels to the ſize of his boiler, which is like a waſhing copper, holding eight or ten gallons of water. Bottom of the veſſel is pierced with auger holes, and tightened round with a wet cloth, to keep in the ſteam: when done, are overturned into a cooler, and given to cattle, mixed with chopped hay or ſtraw (*a*). Has had ſeventy head of fattening cattle on ſteamed potatoes at a time; expence 5s. 3d. per head per week. For beaſts of ten to eleven ſcore per quarter, including hay, fuel, attendance, and the potatoes reckoned at 1s. per buſhel.

Mr. Crook has fed nine horſes with ſteamed potatoes, at 1½d. per buſhel per diem for the nine; gave no oats nor hay, but as much cut ſtraw as they could eat. Is convinced that the practice for both anſwers well (*b*).

At Aveley, in Eſſex, waſhing and ſteaming coſt 2d. per 100 pounds. To 300 pounds, half a pint of ſalt and a ſmall quantity of ſulphur; this ſufficient for a horſe conſtantly worked ſix days; which is 9000 pounds for half a year, being three-fifths of an acre's produce. Fed thus, they perform their work well.

COMPARISON OF FOOD.

In wintering a Team of Five Horſes.

	£.	s.	d.
Three acres of potatoes producing 45,000 pounds, or 600 buſhels, will ſupport five horſes twenty-ſix weeks, which at ¼ of a pound, or 1s. 6¾d. per buſhel, amount to — —	46	17	6
Steaming, at 2d per 100 pounds —	3	15	0
Three buſhels of ſalt, at 6s. — —	0	18	0
Sulphur — — —	0	2	6
	£. 51	13	0

(*a*) Cornwall, p. 42.

(*b*) Mr. Crook's MS. information.

HAY AND OAT ACCOUNT.

	£.	s.	d.
Five horſes twenty-ſix weeks, at two buſhels of oats per horſe per week, 260 buſhels, at 2s. 6d. —	33	10	0
Twenty-four pounds of hay per horſe per week, ten loads and three quarters, at 3l. —	31	0	0
	£. 64	10	0

	£.	s.
Hay and oats —	64	10
Potatoes —	51	13
(*c*) Difference in favour of potatoes	£. 12	17

In Northumberland they are given raw to horſes, after the rate of two pecks per day each horſe; and found very uſeful in the ſpring, when hay and ſtraw become dry (*d*).

In Dumbartonſhire, horſes are fed with potatoes; about three-eighths of a peck, the Dumbarton peck being equal to two pecks at Edinburgh. Three-eighths of a peck of oat-ſeeds or huſk, and half a peck of chaff, made a hearty ſupper for a horſe in winter, when he is not hard wrought (*e*).

In Annandale they anſwer well for horſes, when they are upon white fodder: ten pounds weight of clean-waſhed raw potatoes make a moderate feed for a horſe (*f*).

In Eaſt Lothian, horſes are found ſo fond of Surinam potatoes, that, when accuſtomed, they prefer them to corn; excellent for foals and young horſes, keep them open in body, and ſmooth in coat; growing as much in the winter as in the ſummer: nine pounds is a ſufficient feed for a pair of horſes, with half the uſual allowance of oats. Such a feed coſts only 1d. (*g*).

In Roxburghſhire, potatoes are given to horſes in the quantity of one quarter of a Linlithgow bare firlot, to keep their bodies open (*h*).

It is aſſerted, that in ſome parts of Scotland, Yams or Surinam potatoes are diſcontinued for horſes, as they were found to produce gripes and cholics (*i*).

(*c*) Eſſex, Vancouver. (*d*) Northumberland, p. 40. (*e*) Dumbarton, p. 62.
(*f*) Dumfries, App. p. 29. (*g*) Eaſt Lothian, p. 82. (*h*) Roxburgh, p. 63.
(*i*) North Wales, Flint. p. 13.

Other Authorities.

Roaſted on kilns, the beſt way of giving potatoes to horſes (*g*).

Mr. May, of Suffolk, experiences the importance of this root for horſes more, perhaps, than any man in England; he keeps nineteen horſes and four cows on a farm of 600 acres, without a ſingle acre of meadow or artificial hay. His entire dependence is on potatoes, chaff, and ſtraw; gives one buſhel per diem, cut very ſmall, to each horſe, to make them eat the more dry meat (*h*).

Mr. Stewart, in Kent, fed two horſes with potatoes boiled, a whole winter; they ate nine buſhels a week, had no hay nor corn, only cut. No horſes went through their work better (*i*).

Mr. Longfield, in Ireland, when he feeds his horſes with potatoes (the Cluſter ſort) gives no oats; do well on them raw, but beſt boiled. Bullocks and ſheep are equally fond of them. He has ſo great an opinion of this root for live ſtock, that he left off turnips for them (*k*).

In Scotland, found excellent for horſes, raw, but well waſhed; but, if hard wrought, oats are given.

Mr. Kirby, in Suffolk, buys, for horſes, at 1s. per buſhel (*l*).

Mr. May, of Suffolk, ſells all the Ox-Nobles he can at 1s. but never under; uſing the reſt for horſes (*m*).

Mr. Young aſcertained the value of the Cluſter ſort, in various experiments, to be, for feeding horſes, 9d. (*n*).

Mr. Eccleſton, of Lancaſhire, fed his horſes with boiled potatoes and chaff (no oats) and found them worth 1s. per buſhel (*o*).

Mr. Billingſley, in 1793, fed his horſes with potatoes partially, to the ſowing of oats; and aſcertained the value of the potatoes to be 8d. per buſhel (*p*).

SECTION V.

POULTRY.

IN Roxburghſhire, a common practice to make hens lay well, is to give frequently boiled potatoes, with a ſmall quantity of meal; both a little warm (*a*).

(*g*) Annals, vol. 1. p. 283. (*h*) Ibid. vol. 18. p. 314. (*i*) Ibid.

(*k*) Iriſh Tour, vol. 1. p. 416. (*l*) Annals, vol. 1. p. 285.

(*m*) Ibid. vol. 18. p. 314. (*n*) Society Tranſ. vol. 4. p. 91.

(*o*) Annals, vol. 16. p. 91 (*p*) Ibid. vol. 22. p. 167. (*a*) Roxburgh, p. 64.

RECAPITULATION,

Value of Potatoes applied to Live Stock.

BY CATTLE.

	per buſhel.	
	s.	*d.*
Cumberland	0	4
Nottingham	0	8
Somerſet	0	10
	0	4
Eſſex	0	5½
Suſſex	0	7½
Ditto	0	6
Ditto	0	5
Ditto	0	4
Kent	0	9
Suffolk	0	1½
Ditto	0	0
Ditto	0	0
Ditto	0	0
Ditto	0	6
Ditto	0	2½
Kent	0	6
Suffolk	0	1
Kent	0	6
Suffolk	0	8
Kent	0	6
	8	3
Average	0	4¾

BY HOGS.

	per bufhel.	
	s.	*d.*
Cumberland - - -	0	4
Somerſet - - -	0	10
Stafford - - -	0	10½
Suffolk - - -	0	3½
Ditto - - - -	0	6
Ditto - - -	0	8¼
Somerſet - - - -	0	0½
Kent - - - -	0	0
Stafford - - -	0	5
	3	11¾
Average	0	5¼

BY HORSES.

	s.	*d.*
Suffolk - - - -	1	0
Ditto - - -	0	9
Lancaſter - - -	1	0
Somerſet - - -	0	8
	3	5
Average	0	10¼

OBSERVATION.

The authorities here collected on cattle and hogs are numerous; and it is remarkable, that the general reſult is ſo nearly the ſame in thoſe two applications. In regard to horſes, they may appear much more valuable, owing to the circumſtance of this application depending on *eſtimate:* the ſaving of corn or hay can only be calculated. This mode of applying the root has conſequently more uncertainty in it as an aſcertainment of value than the others; for ſheep, experiments are yet wanting. Upon the whole, the value of potatoes applied to the live ſtock of a farm, may, in a general way, be eſtimated to pay from 4d. to 6d. per buſhel.

CHAP. XIII.

OF THE EXPENCES.

Authorities from the Reports.

IN Cheſhire, as ſtated by way of account,

	£.	s.	d.
Thirty tons of dung, at 3s. 6d.	5	5	0
Tillage	1	2	6
Dibbling and covering 1½d. per ſixty-four yards	0	9	5¼
Soiling or covering with earth	0	9	5¼
Digging up, 6d. per ſixty-four yards (*a*).	1	17	9

In Dorſetſhire, potatoes pay 4s. per acre for tithe (*b*).

At Aveley, in Eſſex,

	per acre.		
	£.	s.	d.
Cutting, dibbling every furrow, and dropping	0	8	0
Once hoeing and moulding up	0	4	6
Digging up, gathering, and houſeing	2	0	0
Ploughing	0	5	0
Tilling, carting, and ſpreading the dung	0	7	6
Seed (*c*).			

In Somerſetſhire, the expences of raiſing this crop amount to 6d. per buſhel, of eighty pounds, on the produce (*d*).

A very ſucceſsful and experienced cultivator, in Eſſex, thus calculates: Crop ten tons an acre, beſides chats, and two tons of chats; according to the ſeaſon, more or leſs. Chats 20s. to 30s. per ton.

(*a*) Cheſter, p. 20.
(*b*) Dorſet, p. 18.
(*c*) Eſſex, Vancouvre.
(*d*) Somerſet, p. 82.

EXPENCES.

	£.	s.	£.	s.	d.
Rent	2	0			
Tythe	0	8			
Rates	0	10			
			2	18	0
Three ploughings			1	10	0
Three or four harrowings			0	3	6
Twenty loads of dung			12	0	0
Spreading			1	0	0
Planting			0	16	6
Cutting the ſets			0	6	0
20 cwt. of ſets			3	10	0
Three hand-hoeings, at 10s.—8s.—and 6s.			1	4	0
Taking up, waſhing, and ſorting (nine men) one load of 1½ ton, or 12s. per ton; ten tons			6	0	0
Market expences, 40s. for nine ton			2	2	0
			£. 31	10	0

PRODUCE.

	£.	s.	d.
Ten tons, at 3l. 10s.	35	0	0
Two ditto chats	2	10	0
	37	10	0
	31	10	0
(e) Profit	£. 6	0	0

Other Authorities.

At Ilford, in 1784, dibbling from twelve to fourteen inches ſquare, 7s. 6d.; two hand-hoeings, 8s.; digging and picking, 6d. per rod.

TOTAL EXPENCE PER ACRE.

	£.	s.
Rent, tithe, and rates	2	2
Manure	4	0
Carr. over	£. 6	2

(e) MS. Papers of the Board.

	£.	s.
Brought over	6	2
Tillage	0	13
15 cwt. ſeed, at 5s.	3	15
Cutting, 4d. per cwt.	0	5
Planting	0	8
Two hoeings	0	8
Digging up, 6d. per rood	4	0
	£. 15	11

beſides the expence of picking, ſorting, and carrying to market *(f)*.

Mr. William Pitt, of Staffordſhire, formed, that the expence was as follow:

	£.	s.	d.
Upon old turf, rent, &c.	1	10	0
Twenty loads raw dung, at 2s. 6d.	1	5	0
Digging and planting	2	10	0
Twenty buſhels of ſets, at 1s. 6d.	1	10	0
Hoeing and weeding	0	7	6
Taking up, and ſorting	2	10	0
	£. 9	12	6
On clover lay ploughed	8	1	3
After turnips ploughed	6	11	0
Upon wheat ſtubble, dung and lime *(g)*.	6	13	9

Mr. Abdy, on woodland, grubbed and dunged, 16l. 13s. 6d. On other land, dunged, 13l. 19s. 4d. (*b*).

Mr. Mayo, of Suſſex, in drills, raiſes 450 buſhels for 5l. 15s. 11d. but ſeventy loads (ſixteen buſhels) of dung are reckoned at only 1l. 10s. *(i)*.

Mr. Billingſley; 301 acres coſt 2839l. 9s. 4d.; or, 9l. 9s. 3d. per acre *(k)*.

Mr. Dann, of Kent; expence of twenty-eight acres and a half, in 1793, 250l. 8s.; or, 8l. 18s. an acre *(l)*.

Mr. Dunn, 9l. 8s. 2d. reckoning only half a year's rent; if a year's, 10l. 3s. 2d. (*m*).

(*f*) Annals, vol. 2. p. 100. *(g)* Ibid. vol. 7. p. 36. (*h*) Ibid. vol. 10. p. 327.
(*i*) Ibid. vol. 11. p. 251. *(k)* Ibid. vol. 21. p. 36. *(l)* Ibid. vol. 22. p. 166.
(m) Society Tranſactions, vol. 9. p. 44.

Mr. Wright, in Norfolk, per acre, 13l. 2s (*n*).
Mr. Bartley drills at three feet, above 10l. an acre (*o*).
Mr. Whimpey, in drills, 6l. 13s. (*p*).
At Sandy, in Bedfordſhire, 12l. 1s. 6d. (*q*).
Near Morpeth, 12l. 5s. 6d. (*r*)
Mr. Parkinſon, of Doncaſter, 14l. 12s. 6d. (*s*).

OBSERVATION.

No general concluſions can be drawn from the variations in the expences of this culture. The modes purſued being ſo different, and the coſt or expences of manure ſo various, that every ſituation muſt require a calculation for itſelf. Enough appears, however, to ſhew, that in general the expence is high, and that it would be in vain anywhere to attempt the cultivation without the application of a large acreable capital. When regiſtered experiments become much more numerous than they are at preſent, facts will be more clearly applicable to every caſe that may occur, and a greater preciſion attainable.

(*n*) Bath Memoirs, vol. 1. p. 31.
(*o*) Ibid. vol. 4. p. 286.
(*p*) Ibid. vol. 5. p. 30.
(*q*) Young's Northern Tour, vol. 1. p. 54.
(*r*) Ibid. vol. 3. p. 20.
(*s*) MS. Papers of the Board.

CHAP. XIV.

APPLICATION OF POTATOES AS FOOD FOR MAN.

Authorities from the Reports.

IN Forfar, they conſider the importance of this root as great, from the circumſtances of being able to command a ſupply of food for the poor in July, before the corn harveſt comes on; in which view early planting in the ſpring is an object. (*a*).

In the Central Highlands, potatoes having become the principal food of the common people, is conſidered as the greateſt bleſſing that modern times have beſtowed on the country: has probably more than once ſaved it from the miſeries of famine. Before the introduction of this ineſtimable root, famines were frequent in the Highlands (*b*).

It would be difficult to calculate how much the introduction of this plant into the Hebrides has improved their arable lands, and bettered the condition of the poorer inhabitants (*c*).

In Eaſt Lothian it conſtitutes nearly one-third of the food of the common people, from the firſt of Auguſt to the end of May (*d*).

Of all others the moſt valuable root in Perth; yields more ſuſtenance by the acre than any plant we know; has done more to prevent emigration than any device whatever (*e*).

In Banff, the introduction of potatoes, without doubt, is the moſt important improvement that ever found its way into the country: had it not been of general uſe, in 1783, it is probable that many of the inhabitants would have periſhed for want of food (*f*).

Of all the benefits the lower claſſes of the community have acquired within the preſent century in Ayrſhire, the general cultivation of potatoes is probably the moſt important (*g*).

It is a common practice in Devonſhire to make bread of potatoes mixed with flour, done by ſimply maſhing the potatoes after they have been boiled, and mixing them with the flour or leaven (*h*).

(*a*) Forfar, p. 14. (*b*) Central Highlands, p. 21. (*c*) Hebrides, p. 70. (*d*) Eaſt Lothian, p. 79. (*e*) Perth, 40. (*f*) Banff, 18. (*g*) Ayrſhire, p. 26. (*h*) Devon, p. 70.

In boiling potatoes, it is proper to put a good deal of ſalt in the water, which makes them more mealy; that being the uſual mode followed in London (*i*).

In Cardiganſhire, potatoes with barley-bread form the chief ſuſtenance of the poor (*k*).

It is no uncommon thing in Somerſetſhire for a family, conſiſting of a father, mother, and five or ſix children, to conſume twenty ſacks per year, 240 lbs. the ſack, or 20 lbs. per head per week, allowing twelve weeks ceſſation from this food. Indeed the children nearly ſubſiſt on it, and the deprivation thereof would bring the whole family to the pariſh (*l*).

Robert Barclay, Eſq. ſent the Board two loaves made of two-thirds wheaten flour and one-third mealy potatoes, with four other loaves, which were made out of 16 lbs. wheat flour, and 8 lbs. of potatoes (which were weighed after being pared, then boiled, and afterwards ſtrained into flour through a ſieve); the ſix loaves weighed 4 lb. 15 oz. each before baking; and after baking three in the uſual form, and three in tin hoops to cruſt them (by which they generally loſe from four to five ounces) they average 4 lb. 5½ oz. or full 26 lbs.

On another occaſion he baked 20 lbs. of flour and 10 lbs. of potatoes, which yielded only eight loaves, of 4 lbs. 3½ oz. each, of the common form, making 33¾ lbs. of bread out of dough (*m*).

Other Authorities.

At Leſliehill, in Ireland, a man, his wife, and four childreen, will eat four buſhels per week. If they live upon oatmeal, they will eat 40 lbs. or two buſhels of oats (*n*). In another part of the ſame diſtrict, a barrel laſts a family of ſix, eight days (*o*).

At Weſtport, in Ireland, a man, his wife, and four children will eat a buſhel of 3 cwt. a week, in 39 weeks five ton 17 cwt. which is juſt half an acre Iriſh. Of oatmeal, the common allowance is a quart a day for a labourer (*p*).

At Shaen's Caſtle, Queen's County, in Ireland, a barrel of potatoes will laſt a man, his wife, and four children, a week. One barrel of oats will yield 1 cwt. of oatmeal, which ſells at 8s. 6d. to 10s. and will, in *Stirabout*, laſt them a week; the ſame time as a barrel of potatoes (*q*).

At Shaen's Caſtle, in Antrim, a man, his wife, and four children, will eat three buſhels of potatoes and 20 lbs. of oatmeal a week (*r*).

At Caſtle Caldwell, in Ireland, a man, his wife, and four children, eat

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(*i*) MS. Papers of the Board.

(*k*) Cardigan, p. 28.

(*l*) Somerſet, p. 81.

(*m*) MS. Papers of the Board.

(*n*) Iriſh Tour, vol. 1. p. 183.

(*o*) Vol. 1. p. 185.

(*p*) Vol. 1. p. 315.

(*q*) Vol. 1. p. 64.

(*r*) Vol. 1. p. 174.

eighteen ſtone of potatoes a week, or 252lbs.; but 40lbs. of oatmeal will ſerve them (*s*).

In King's County, in Ireland, a barrel will laſt a family of five perſons a week (*t*).

At Derry, in the ſame county, a family of five perſons will eat and waſte forty-two ſtone in a week (*u*).

At Cullen, in Ireland, two barrels will laſt a family a week, as they are uſually conſumed (*v*).

A buſhel, equal to 20lb. of oatmeal (*w*).

A man, his wife, and four children, will eat 252lbs. a week; but 40lbs. of oatmeal will ſerve them (*x*).

A barrel being everywhere twenty ſtones, or 280lbs. it is about the weight of four Engliſh buſhels; which quantity, on the average, laſts ſix people ſix days; which makes a year's food ſixty barrels. The average produce of all Ireland is eighty-two barrels the plantation acre: one acre therefore ſupports eight perſons the year through, which is five perſons to the Engliſh acre (*y*); but if an Engliſh acre produces 300 buſhels, it will ſupport, proportionally to this Iriſh conſumption, ſeven perſons and an half a year.

Potatoe-flour may be kept ſeven or eight years (*z*).

In the country, called the Fylda, below Preſton in Lancaſhire, the people mix potatoes and flour, and bake them into flat cakes upon an iron plate, or what is called a girdle: more practicable in poor families than forming the dough into loaves (*a*).

OBSERVATIONS.

The facts here collected ſeem to afford ſome intelligence that merits, in ſuch times of ſcarcity as this kingdom has at different periods experienced, a ſingular attention. Suppoſe the average family to conſiſt of five perſons, the conſumption is 240 buſhels per annum; and if an acre produces 300 buſhels, 128 perches of land is the quantity neceſſary for each family, or ſomething more than three roods. There is ſo ſmall apparent difficulty in aſſigning to every cottage ſuch a ſpot of land, that apprehenſions of any dangerous ſcarcity of proviſions do not appear to be conſiſtent with a ſyſtem ſo eaſily executed; and were every cottage to have but one rood, or half an acre, of this nouriſhing root, without relying on it for their entire conſumption, it would clearly be highly advantageous in years of dear provi-

(*s*) Iriſh Tour, vol. 1. p. 224. (*t*) Vol. 2. p. 11. (*u*) Ibid. p. 36. (*v*) Ibid. p. 49. (*w*) Vol. 1. p. 191. (*x*) Ibid. p. 224. (*y*) Vol. 2. p. 120. (*z*) Mem. de Berne, 1764, tom. 2. pt. 2. p. 13. (*a*) MS. Papers of the Board.

ſions. The Committee are ſo ſtrongly impreſſed with this idea, that they would be wanting in attention to the ſubject, if they did not recommend to the Board at large, and individually to every gentleman of landed property, to take ſuch ſteps on their reſpective eſtates as may enable cottagers to poſſeſs this comfort. It ſhould, however, be obſerved, that the potatoe demands ſo much dung, that the merely aſſigning to a cottage two or three roods of land would not alone be ſufficient; the graſs neceſſary for the year's ſupport of a cow muſt be annexed, or potatoes could not be cultivated by cottagers. One cow with a pig, and the family itſelf, might with careful management raiſe manure ſufficient. The Committee is ſenſible that objections have been raiſed againſt a ſyſtem which is not found in the richeſt counties, and thoſe where the poor are moſt at their eaſe; but is found in the pooreſt diſtricts of the Britiſh dominions. Queſtions of great importance in political œconomy are involved, which it would be improper to touch on here; but while the kingdom is and has been alarmed with apprehenſions of ſcarcity, there can be no impropriety in ſhewing, that the cultivation of this root is one obvious means of removing ſuch apprehenſions, and of enabling a ſmall ſpace of land to maintain a greater population than can probably be effected in any other way.

It has been aſcertained by various political arithmeticians, that the maſs of mankind eat, one with another, when feeding principally upon wheaten bread, one quarter of wheat per annum. Five perſons therefore eat five quarters: and if the average produce of that grain be three quarters, then 266 ſquare perches of land are neceſſary to feed a family of five, or more than double the quantity of land which nouriſhes them by means of potatoes. The compariſon, however, does not depend altogether upon the breadth of land; the expence is equally to be conſidered: and in this reſpect it muſt be admitted, that an acre of potatoes coſts conſiderably more than an acre of wheat; probably double, reckoning not by particular experiments or practices, but by the general view already given.

But potatoes do not want this recommendation in the light of a poor cottager cultivating for himſelf; they are, perhaps, a more certain crop; the culture better adapted to the powers of a poor family, and, above all other points, may be repeated on the ſame land which wheat cannot.

The experiments that have been made on potatoe-bread are, in one reſpect, ſatisfactory. It clearly appears that good bread may be made by mixing two-thirds of wheat flour with one-third of potatoes; but how far ſuch bread is nouriſhing to hard-labouring perſons, and in what degree the practice would be œconomical, theſe are queſtions not to be ſolved without varied and long experience. The facts ſtated muſt be left to themſelves; for to draw concluſions, might miſlead.

That the general encouragement of this cultivation is an object of great importance, cannot be doubted; for without ſuppoſing an entire dependence upon it by any families, yet having in all parts of the kingdom large quantities, ſtored with a view either to ſale or the food of cattle, might of all other circumſtances be that which would prove moſt effective in preventing any ſcarcity of wheat becoming oppreſſive to the poor. How this valuable object might be moſt eaſily attained, is a queſtion of difficulty. The low value, when applied to live ſtock, will ever prove a diſcouragement to the culture; but poor families can well afford to pay from 1s. to 1s. 3d. the buſhel: which is a price ſufficient to render the culture a very profitable one. To encourage therefore the regular conſumption among the lower claſſes, ſeems to be, of all other modes, the ſureſt to promote the growth. No public body can do more in this way, than to recommend to individuals; and the attention which the Board has already very wiſely given to the ſubject, has certainly had its effect; and, it is to be hoped, will continue to operate as an excitement to thoſe whoſe ſituation in the country enables them, by various means, to promote a practice ſo clearly beneficial.

In a preceding Chapter of this Report, reaſons occurred for ſuppoſing this plant, when introduced in a rotation of common huſbandry, either to be an exhauſter of the ſoil, or at leaſt to be in that reſpect of a very queſtionable quality; but upon waſte ſoils in a ſtate of nature, as mountains, moors, and bogs, the authorities are nearly uniform in its favour. To encourage the cultivation on ſuch, upon the largeſt ſcale, will be an object much deſerving the attention of the Board.

APPENDIX.

No. I.

Communications on Potatoes, by Dr. WRIGHT *of Edinburgh.*

SOLANUM TUBEROSUM LINN. SPEC. PLANT.

COMMON POTATOE.

HISTORY. The potatoe is a native of America, and well known to the Indians, long before the conqueſt of Mexico and Peru. Gomara, in his General Hiſtory of the Indies, and Joſephus Acoſta, are amongſt the early Spaniſh writers who have mentioned the potatoe by the Indian names *Openanck*, *Pape*, and *Papas*. Cluſius, and after him Gerard, gave figures of the potatoe-plant. Gerard was the firſt author who gave it the name Solanum Tuberoſum, which Linnæus and his followers adopted.

In 1584, Sir Walter Raleigh, ſo celebrated for his worth, his valour, and his misfortunes, diſcovered that part of America called Norembega, and by him named Virginia. Whether the admiral was acquainted with the potatoe in his firſt voyage, or whether it was ſent to him by Sir Thomas Grenville, or Mr. Lane, the firſt governor of Virginia, is uncertain. It is probable he was poſſeſſed of this root about the year 1586. He is ſaid to have given it to his gardener, in Ireland, as a fine fruit from America, and which he deſired him to plant in his kitchen-garden in the ſpring. In Auguſt this plant flowered, and in September produced a fruit; but ſo different to the gardener's expectation, that in an ill humour he carried the potatoe-apple to his Maſter. "Is this (ſaid he) the fine fruit from America you prized ſo highly?" Sir Walter either was, or pretended to be, ignorant of the matter; and told the gardener, "ſince that was the caſe, to dig up the weed, and throw it away." The gardener ſoon returned with a good parcel of potatoes.

Gerard, an old Engliſh botaniſt, received ſeedlings of the potatoe about the year 1590; and tells us that it grew as kindly in his garden as in its native ſoil, Virginia. The plant was cultivated in the gardens of the nobility and gentry early in the laſt century, as a curious exotic; and towards the end of it (1684) was planted out in the fields, in ſmall patches, in Lancaſhire. From thence it was gradually propagated all over the kingdom, as well as in France.

In 1683, Sutherland has the Solanum Tuberoſum in his Hortus Medicus Edinburgenſis; and it is probable that many others in Scotland cultivated the potatoe in their gardens about that time. It was not, however, cultivated in open fields in Scotland till the year 1728, when Thomas Prentice, a day-labourer, firſt cultivated potatoes at Kilſyth. The ſucceſs was ſuch, that every farmer and cottager followed his example; and for many years paſt it has become a ſtaple article. Thomas Prentice, by his induſtry, had ſaved 200l. ſterling, which he ſunk for double intereſt. Upon this he ſubſiſted for many years, and died at Edinburgh in 1792, aged eighty-ſix years.

Culture. After the number of able Reports to the Society of Agriculture, and the notices in many of the ſtatiſtical accounts from the clergy in Scotland, nothing ſcarcely new can be ſaid on the ſubject. I need only remark that this extoic thrives as well in Europe as it does in America. In this iſland particularly, it is quite at home; and there is hardly a ſoil, but, with a little pains, may be made to produce the potatoe. In dry ſeaſons, when the crop of corn falls ſhort, the potatoe is moſt abundant *. The potatoe may be cultivated in every habitable part of the globe; but with various ſucceſs. The heat of the Weſt Indies is too great for it; but in Jamaica, and other mountainous iſlands, where they have all climates, I have ſeen the potatoe in great perfection.

Uſe. On account of the potatoe being a ſpecies of Solanum, or nightſhade, there were many who were prejudiced againſt it, alledging it was narcotic. In Burgundy we find the culture and uſe of potatoes in food interdicted, as a poiſonous and miſchievous root. Amongſt other effects, it was accuſed of occaſioning leproſy and dyſentery. Potatoes expoſed to the ſun and weather a few days, acquire a green colour, bitter taſte, and a narcotic quality. In this ſtate they are not fit for eating; but there is not the ſmalleſt foundation for the other allegations. Prejudice and ignorance have long yielded to experience and truth; and all mankind at this day agree, that there is no food more wholeſome, more eaſily procured, or leſs expenſive than the potatoe. It conſtitutes the chief article of food to vaſt numbers of people, and may be converted to the ſupport of all domeſtic animals and poultry, whether raw, boiled, or roaſted.

Potatoe-Flour. In the ſimple analyſis of the potatoe, we find it is compoſed of three diſtinct and eſſential principles. Firſt, A mucilaginous juice, which has no peculiar properties. Secondly, A fibrous, light, and gray coloured matter, like that contained in the roots of many pot-herbs. Thirdly, A dry powder, reſembling ſtarch from grain. To obtain this powder, the proceſs is eaſy: The freſh potatoes muſt be waſhed clean, and grated into a clean veſſel; this pulp is next put into a hair-ſieve, and mixed with cold water; when, by repeated effuſions of water, the ſtrainings are no longer white or milky, what remains in the ſearch may be put to one ſide; the ſtrained liquor is ſuffered to ſettle, and the brown coloured water drained off and thrown away. Repeated quantities of cold water are then poured on the white hard maſs, well ſtirred up each time, and when ſettled, and the water poured off till the ſediment is perfectly white, this matter is then taken out, the lumps broken down, and put upon paper to dry. If the potatoe is ground by means of a wheel-grater, or cylinder, ſhod with a grater, the proceſs will be ſhortened. A hopper may be adapted to one ſide of the grater, in ſuch a manner as to aſſiſt in rubbing down the potatoe without putting to the hand.

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* This is not generally the caſe.

This powder of the potatoe is obtained in different proportions, according to the goodneſs of the potatoe itſelf: at an average, two ounces of the powder may be got from one pound of potatoes. Potatoe-flour, or powder thus made, is no way different from ſtarch made from grain; and anſwers many purpoſes in domeſtic œconomy. Bowen's Sago Powder is no other than the ſtarch of potatoes; as the Tapioca from Brazil is the ſtarch of caſſada. Theſe articles are ſold in the ſhops at an advanced price; and as the ſago powder was laid in by government for the ſick in ſhips of war, it may be now made in any quantity, and at a trifling expence.

Potatoe-Flour makes all ſorts of paſtry of a ſuperior quality to common wheat-flour; and if mixed with ſweet milk, eggs, and ſugar, in due proportions, makes excellent cuſtards or puddings. About two years ago, Lord Dundonald had loaf-bread and biſcuit baked from equal parts of common flour and potatoe-powder; but the bread was heavy, never roſe well, ſoon grew extremely hard, and too expenſive.

BREAD OF POTATOES, &c.

For the ſpace of half a century at leaſt, bread has been made in Jamaica from the ſeveral ſorts of yams, eddoes, and caſſada. The two former, by means of leaven; the latter with water, like oat-cakes. Boiled yams or eddoe, being reduced to a dough, was mixed with equal weight of common flour, a little prepared leaven, and a ſufficient quantity of ſalt; all well knead together. After ſome hours ſtanding to ferment, the dough was divided into rolls or loaves, and baked in the uſual manner in an oven.

Potatoe-Bread. In Great Britain, where malt is brewed into ale or beer, yeaſt is preferable to leaven for baking bread.

The moſt mealy potatoes are to be choſen: when boiled and peeled, they are beaten and rolled ſmooth on a table with a rolling-pin; then knead with an equal quantity of wheat-flour, with a ſufficiency of yeaſt, water, and ſalt (this bakers call ſponge); the dough is ſet for a night in a warm place; and by next morning, if the yeaſt is good, it will have riſen, and is ready to be made into loaves, rolls, &c. This bread is much lighter and ſweeter than flour-bread, and keeps moiſt for many days. All will depend on kneading the dough well, and keeping it long enough in the oven till it is thoroughly baked.

Yeaſt. This article at times is very ſcarce in this city. To increaſe its quantity is an object of importance to the bakers of bread. Several bakers of my acquaintance have taken the hint from me, and now are no way at a loſs for yeaſt. Potatoes boiled and ſkinned are put into a ſufficient quantity of water, and boiled over a ſlow fire till the whole becomes ſmooth, and of the conſiſtence of pap. To two Engliſh gallons of this, an Engliſh quart of good yeaſt is added; the veſſel ſet in a warm place twelve or ſixteen hours, when the whole becomes yeaſt of a good quality, and fit for the purpoſes of the baker as well as the brewer.

Biſcuit of Potatoes. To equal quantities of potatoe-pulp and wheat-flour, add a very little yeaſt diluted with hot water: and for every pound a dram (ſixty grains) of ſalt; knead the whole into a firm dough, and bake into biſcuits of the uſual ſize. They muſt be kept in the oven till their moiſture is exhaled; and after ſome days expoſure to dry, will keep for many months.

N. B. If potatoe-powder is uſed inſtead of common flour, the bread is proportionally improved in quality and whiteneſs.

WILLIAM WRIGHT, M. D. F. R. S.

Edinburgh, 14th March, 1795.

No. II.

ANALYSIS OF THE POTATOE-ROOT, BY DR. PEARSON.

Experiments and Obſervations on the conſtituent Parts of the Potatoe-Root.

By George Pearson, M. D. F. R. S.

THE Board of Agriculture having requeſted me to enquire into the compoſition, or parts, of which the potatoe-root conſiſts; and particularly to aſcertain the proportion and nature of the watery part; I have now the honour of laying before the Board the following experiments and obſervations:

It will be proper firſt to obſerve, that the ſort of potatoe-root uſed in theſe experiments, was that, well known by the name of *Kidney Potatoe*; and that the ſkin was taken off by paring it in the uſual way.

Experiment I. 3500 grains of potatoe-roots cut into ſlices of about one-eighth to one-twelfth of an inch in thickneſs, after expoſure in a large glaſs-diſh to the heat of the ſteam of a water-bath, of 190 to 200 degrees of Fahrenheit's Thermometer, afforded 1000 grains of a very brittle, hard, heavy ſubſtance. Some pieces of this ſubſtance were whitiſh, others brown, and many of them alſo were black, being a little burnt.

Experiment II. On a repetition of the preceding experiment, the reſult was nearly the ſame; 3500 grains of the potatoe-roots affording about 1000 grains of hard brittle ſubſtance.

Experiment III. 7000 grains of ſliced potatoe-roots, treated as in the preceding experiments, yielded 2100 grains of dry brittle matter.

Experiment IV. 3000 grains of ſlices of potatoe-root being evaporated in a ſand-bath of a higher temperature than the water-bath, there remained 900 grains of brittle, dry, hard pieces of matter; moſt of which were burnt a little, and black.

Experiment V. The whitiſh and unburnt dried ſlices of potatoe-roots being ground to powder, afforded a grayiſh meal, or farina, of the taſte of raw potatoe-root, of about the ſame ſpecific gravity, and drier than meal of wheat in its uſual ſtate.

From the above experiments it appears that the potatoe-roots afford about five-ſevenths of their weight, or twenty-eight to thirty per cent. of meal. Hence, if a buſhel of theſe roots weigh ſeventy-five pounds, it ſhould yield twenty-one or twenty-two pounds of meal.

Experiment VI. 17,500 grains, or 3 pounds and half an ounce, troy-weight, of ſliced potatoe-roots, were diſtilled to dryneſs by the heat of the ſteam of water.

The diſtilled liquid amounted to 13000 grains, or about 27 ounces, and meaſured near one pint and ten ounces. The dry matter, in the retort, weighed nearly 4500 grains.

The diſtilled liquid was clear and colourleſs as rock water; it had the ſmell of the potatoe-root, and alſo a ſlight empyreumatic ſmell; it had no taſte; it did not alter the colour of paper ſtained with turnſol, nor that with turmeric: being evaporated to dryneſs, a quantity of reſidue was left behind, but much too ſmall in quantity to be collected and weighed: it ſeemed to be common ſalt, which I imputed to the water with which the receiver had been waſhed. This diſtilled liquid may therefore be conſidered to be pure water, excepting the impregnation with a little eſſential or volatile, and perhaps empyreumatic oil.

Experiment VII. A quantity of potatoe-roots was raſped; and in this ſtate they reſembled curdy matter in watery liquid. Of theſe raſped potatoes 7000 grains were mixed with four pints of river-water. After being macerated twenty-four hours, during which time the mixture was frequently ſtirred, a clear dark brown liquid, of the ſmell of potatoe-root, poſſeſſing neither acid nor alkaline properties, was poured off, leaving behind a large proportion of leafy or fibrous ſubſtance, and a precipitate of white impalpable powder. This white precipitate and fibrous ſubſtance were macerated repeatedly with freſh portions of water till the decanted was colourleſs, and without ſmell or taſte. The fibrous ſubſtance and white precipitate being mixed with water, were poured upon a fine hair-ſieve, through which the water paſſed, carrying with it the white precipitate; and the fibrous matter was left behind. The white ſediment depoſited from the filtrated water, on ſtanding, being collected and dried, weighed 1050 grains. It had the obvious or ſenſible properties of ſtarch of wheat, and afforded a tranſparent jelly with boiling water. The leafy and fibrous ſubſtance being dried, was ſmall, hard, brittle irregular figured maſſes, which amounted in weight to 600 grains. A pint of the firſt filtrated brown liquid, poured off from the leafy ſubſtance and white precipitate, being evaporated, an extract was obtained, which had a ſtrong ſmell of potatoes, and from empyreuma. It had a ſlight ſaltiſh taſte; but to the teſts of turnſol and turmeric, betrayed no acid or alkaline properties. The whole extract or ſoluble mucilage in 7000 grains of potatoe-root, by eſtimation, was from 350 to 400 grains. In courſe, the quantity of water in their quantity of potatoe-root, was about 5000 grains.

Experiment VIII. A little of the dried *leafy ſubſtance*, obtained in the laſt experiment, and alſo a little of the *extract*, emitted the ſmell of farinaceous ſubſtances, and not at all that of animal matter in general, or of glue of wheat in particular.

Experiment IX. A bit of paper ſtained blue by turnſol, being applied to a ſlice of potatoe-root, was inſtantly turned to a red colour.

Experiment X. 1000 grains of potatoe-root being burnt in an open crucible, fifteen grains of aſhes were left, which conſiſted principally of mild pot-aſh, probably mixed with earth, oxide, or calx of iron, and of manganeſe, common ſalt, and perhaps phoſphoric acid united to lime.

Concluſions and Remarks.

1. It appears from the above experiments (I.—VII.) That 100 parts of potatoe-root, deprived of its ſkin or bran, conſiſt of

1. Water,	- -	68 to	72
2. Meal,	- -	32 to	28
		100	100

2. The meal conſiſts of three different ſubſtances:

1. Starch or fecula, -	17 to	15
2. Leafy or fibrous matter,	9 to	8
3. Extract or ſoluble mucilage,	6 to	5
	32	28

3. The potatoe-root contains alſo pot-aſh, or vegetable alkali (*Experiment* X.) By eſtimation, there were ten grains of it in its mild ſtate from 1000 grains of the root; but as of theſe ten grains not leſs than two and a half were carbonic acid, or fixed air, produced during burning, we cannot reckon the quantity of this alkali more than ſeven grains and a half in 1000 of the root; that is, three-fourths of a grain per cent.

4. The aſhes of 1000 grains of potatoe-root afforded alſo ſeven grains and a half, or three-fourths of a grain per cent. of ſubſtances not examined (*Experiment* X); but which are very probably the ſame ſubſtances afforded by the aſhes of vegetable matters in general; namely, oxide, or calx of iron, and of manganeſe, phoſphoric acid united to lime, magneſia, and muriate of ſoda, or common ſalt.

5. The ſubſtances found in the aſhes of 1000 grains of the potatoe-root amounting to fifteen grains (*Experiment* X.) do not, we have good reaſon to believe, enter into the compoſition, or are eſſential conſtituent parts of the root, but are merely extraneous matters, introduced into the plant along with water, air, and other aliment, or are ſecreted by the powers of the vegetable œconomy.

6. There is alſo in the root under examination, volatile eſſential oil, or *ſpiritus rector*, to which is owing its ſmell and the little taſte it poſſeſſes. The proportion of volatile oil is too ſmall even to be eſtimated; and moſt of it ſeems to fly off with the water during diſtillation or evaporation. The greateſt part, or the whole of this oil, may be waſhed out along with the extract, or ſoluble mucilage, as appears from *Experiment* VII.

7. There is in the juice or water of the potatoe-root an acid (*Experiment* IX.) which diſappears upon burning the root to aſhes (*Experiment* X.); either becauſe it is decompounded by the fire or evaporated, or becauſe it enters into chemical union during the combuſtion. The acid is not diſcoverable in the filtrated liquid from the bruiſed root, becauſe the proportion of it is too ſmall to be detected by any teſt when diluted with water; as in *Experiment* VII.

Having ſtated what are the kinds and proportions of the different ſubſtances contained in the root under examination, it will be uſeful to conſider the mode of junctions of theſe with one another.

8. The above experiments, eſpecially Experiment VII. ſhow that the potatoe-root is a mechanical mixture, conſiſting of water, ſtarch or fecula, leafy or fibrous matter, and extract or ſoluble mucilage; for theſe ſubſtances were ſeparated from one another by mechanical means. The ſalts, earths, and metallic oxides, or calces (*Experiment* X) and volatile oil (*Experiment* VI. and VII.) are indeed probably united to the water; but theſe are not conſidered as eſſential conſtituent parts of the root under examination.

9. The compoſition, or more properly the mixture of the potatoe-root, is in many reſpects ſimilar to that of the ſeed of wheat and of maize. We are indebted to James Bartholomew Beccari, profeſſor of chemiſtry at Bologna, about ſeventy years ago, for the important diſcovery that the meal of wheat and maize contained not only ſtarch, but a ſoluble mucilage or extract, and a glue of the ſame nature as animal matter. Theſe three ſubſtances are only mechanically mixed with one another. The glue is not capable of the ſaccharine, vinous, or acid fermentation; but, like animal matter, putrefies. It alſo affords ammoniac or volatile alkali on diſtillation; and on burning emits the peculiar ſmell, and gives the other products of animal ſubſtances. Neither does it afford pot-aſh like vegetable ſubſtances. *Beccari*, in his account of it, ſays, "Maſſa mollis, ſupra quam credi poteſt tenax: egregium glutinis genus, et ad opificia, multa aptiſſimum." The principal and

eſſential difference between the meal of wheat and of potatoes is, that the former contains animal matter, and the latter, in place of it, a leafy or fibrous vegetable matter; but the principal ingredient in point of quantity in both kinds of meal, is ſtarch; and they both afford an extract, or contain a ſoluble mucilage. The proportion of the animal glue of wheat is ſtated variouſly in different experiments; but the general mean reſult appears to be, that it is about one-twelfth of the meal. To this glue is imputed the ſuperior quality of wheat-meal for bread. It is ſuppoſed to give tenacity and firmneſs, and at the ſame time promotes the fermentation in making bread, as well as gives it a taſte.

10. The contemplation of the nature of the conſtituent parts of the potatoe-root, and of other kinds of meal, is perhaps more intereſting to medicine and chemiſtry than to the branch of knowledge called Œconomy. It is, however, immediately relative to the object of the Board to obſerve, that we may ſafely conclude that ninety-eight or ninety-nine parts out of a hundred of the meal of the potatoe-root are convertible or capable of being aſſimilated into animal matter.

11. With reſpect to the comparative quantity of nouriſhment afforded by potatoe-meal, ſeveral eminent writers have aſſerted (but, I believe, from analogy rather than actual obſervation) that wheat-meal, and bread of wheat, is more nouriſhing than an equal weight of other kinds of meal or bread. This concluſion has been made from the fact that the meal of wheat contains animal matter, whereas the other kinds, except of maize, contain none at all, or an extremely ſmall proportion. It appears by abundant evidence that men who are nouriſhed by vegetable food alone, are as long lived and healthy, and are furniſhed with organs, and perform the functions of the animal œconomy, as perfectly as other men who are nouriſhed by animal-food, or by a mixture of animal or vegetable-food. There is alſo ſufficient evidence in many parts of this kingdom and Ireland, that the potatoe-root and water, with common ſalt, or other ſeaſoning, can nouriſh as well as any other vegetable matter and water with ſeaſoning. It might alſo have been concluded from analogy, that the potatoe-root is capable of affording adequate nouriſhment; for the principal vegetable nutriment of mankind is meal, and eſpecially thoſe kinds of meal which contain no animal matter; and the principal, as well as eſſential, ingredient of meal is ſtarch; of which ſubſtance the farina of the potatoe-root contains more than half its weight: a proportion not much, if at all inferior to that of other kinds of meal in general uſe.

I cannot find any juſt ground for the opinion, That the meal of wheat muſt afford much more nouriſhment than an equal quantity of potatoe-meal: for if it be granted that this muſt be the caſe becauſe the former contains animal matter, it is reaſonable to believe that the proportion of the animal matter is too ſmall to occaſion a conſiderable difference between the nutritive properties of wheat and thoſe of other meals. But it appears from ſome experiments of feeding animals upon the glue or animal part of wheat, and upon the meal freed from this animal matter, that the former is much leſs nutritive than the latter.

It is alſo, I believe, a fact, and one of great importance, that potatoes and water alone, with common ſalt, can nouriſh men completely; but other mealy ſubſtances, although the principal food of millions of the human race, who never taſte animal ſubſtances, are always mixed with other kinds of alimentary matter; ſuch as with oil, fruits, whey, milk, ſour milk.

12. To prepare potatoe-meal of the beſt quality, the ſliced roots ſhould be dried in a much lower temperature than in the above Experiments (I.—IV. V.) otherwiſe it will be brown or blackiſh, and have an empyreumatic taſte. The thinner the ſlices, the more ſpeedily, under equal circumſtances, will the roots be dried. They will dry very ſpeedily upon a net, ſuſpended in the air of a kiln of the temperature of about 110 to 130 degrees. I think it will be beſt not to pare off the ſkin, as probably it principally contains the volatile or eſſential oil, which gives an agreeable flavour: nor is there any reaſon to ſuppoſe that the ſkin is not alimentary, or that it poſſeſſes noxious qualities.

It has been propoſed to dry raſped potatoe-roots, after draining off the watery liquid; but the meal ſo obtained will have been deprived of the greateſt part, or all, of one of the ingredients of the root, namely, of the ſoluble mucilage; which alone is undoubtedly nutritive, and probably may render, and be rendered, more nutritive by mixture with the other conſtituent parts of the potatoe-root.

13. There is, I apprehend, no reaſonable doubt that potatoe-meal may be uſed for preparing the different ſorts of ſtarch, diſtinguiſhed by the names of Sago, Tapioca, Vermicelli, Macaroni, Salep, Common Starch; and ſerve for infinitely various compoſitions of cookery; ſuch as puddings, biſcuits, paſtes. The art of fermenting potatoe-meal into bread, in place of wheat, has not yet been diſcovered; but excellent bread can be made by a mixture of about three parts, or perhaps of two parts of meal of wheat, and one part of potatoe-meal; or by a mixture of due proportions of the root itſelf, and wheat-meal.

It has been ſaid, that good bread may be made of a mixture of potatoe-meal or root, and the bran of wheat. It is a matter of curioſity, and might be uſeful to try, to make bread of potatoe-meal, mixed with the glue or animal part of wheat; which is a reſidue of very little value at preſent in the ſtarch manufactories.

14. It is, however, moſt profitable, and perhaps ſalutary, to uſe for food the potatoe-root, cooked by merely boiling or baking. It is obvious,

that it is the ſimpleſt and cheapeſt preparation. In this way the meal is taken into the ſtomach, more intimately mixed or diffuſed through two and a half or three times its weight of water, than is the caſe with artificial mixtures of the meal and water. Hence the eaſineſs of digeſtion and lightneſs of this root above other farinaceous ſubſtances equally nutritive. Hence alſo, this root alone, or with the addition of a ſmall proportion of meat or oil, can afford ſufficient nouriſhment to moſt perſons, without diſordering the ſtomach by its bulk; as is the caſe with the white beet, turnip, onion, and other roots which contain a much larger proportion of water than the root of the potatoe.

It is well known that the potatoe-roots are eaſily kept for many months, without being ſpoiled by growing, or putrefaction; and at the ſame time retain the greateſt part, or the whole, of the water in the freſh root.

There is good reaſon to believe, that cuſtom would ſoon render boiled or baked potatoes as agreeable to the palate as bread; and that they might ſupply its place at dinners of animal food, in many caſes, with deciſive advantages.

15. The potatoe-root may be rendered more nutritive by malting. Malting is an operation of the vegetable œconomy during growth, by which taſteleſs meal is changed into ſweet mucilage, called Sugar. However agreeable to the palate occaſionally this preparation may be, it cannot be of ſuch extenſive uſe as the meal; for, like all ſtrong taſting mucilages, by repeated uſe it palls the appetite. Like them therefore it can, in general, only be uſed occaſionally, and to render other kinds of food ſavoury. On this account ſome of the moſt nutritive vegetable ſubſtances, ſuch as carrot and parſnip-roots, the juice of the ſugar-graſs, honey, &c. cannot ſupply the place of potatoe and other meals, although they are leſs nutritive. Fat oil alſo, although more nutritive than farinaceous ſubſtances, cannot superſede their uſe; becauſe, alone, it ſoon palls the appetite.

The more extenſive cultivation of the above, and other *ſaccharine roots*, and of vegetables which furniſh *oil*, muſt neceſſarily ſerve very eſſentially to render food plentiful, and agreeable or gratifying to the palate, provided they be mixed with due proportions of *farinaceous* ſubſtances.

ANALYSIS.

One pound of potatoes contains, 1ſt. Eleven ounces and an half of water; 2d. Two ounces and an half of ſtarch; 3d. Six groſs of fibrous matter; 4th. One ounce two groſs of mucilaginous and ſaline extract (*a*). The ſtarch may be made for 8d. the pound (*b*).

(*a*) Parmentier Traité de Pommes de Terre, p. 175.

(*b*) P. 218.

ARDENT SPIRIT OBTAINED.

Dr. Anderſon diſtilled potatoes that had been properly fermented, and no addition except yeaſt. He obtained, from 72 lbs. of potatoes an Engliſh gallon, of a pure ſpirit, conſiderably above proof; and about one quart more below proof. It was the fineſt and moſt agreeable vinous ſpirit he ever ſaw (*c*).

No. III.

Letter to Samuel Hayes, of Avondale, Eſq. from Thomas King, Eſq. of Kingſton, in the County of Wicklow, in conſequence of having read the Rev. Dr. Maunſell's Treatiſe on propagating Potatoes, by planting the Sprouts alone.

Communicated by the Dublin Society.

DEAR SIR,

I HAVE read Dr. Maunſell's Treatiſe on Potatoes with great pleaſure; it proves him poſſeſſed of a good heart and underſtanding, and a great friend to the poor; and though there are ſome of his ſtatements and calculations in which I take the liberty of differing from him, I am willing to allow him every merit. As I preſume he never heard of any other perſon who had planted potatoe-ſprouts, his experiment is, as to him, a *diſcovery*, as well as to the perſon who *firſt practiſed* that mode. You will do me the juſtice, however, to recollect that, about twenty-two years ago, I ſent you a large baſket of very fine Wiſe potatoes, raiſed from ſprouts, for the purpoſe of ſhewing them to the Dublin Society, if you thought the diſcovery of importance.—Few years have ſince paſſed in which I have not planted, more or leſs, *ſprouts*; and when my potatoe-pits are opened in ſpring, my labourers never fail to take and plant all the ſtrong ſprouts they can get. My neighbour, Thomas Manning, followed me, and, about twenty years ago, planted ſprouts; and at ſeveral times ſince. The Rev. James Symes had long ſince ſeveral drills in a large field at Clonmanen planted with ſprouts; and the labourers, who laughed at his folly, as they called it, could not, when taking out the potatoes, diſtinguiſh the drills planted with ſprouts from thoſe planted with potatoes: they were all remarkably good. I did one year ſell potatoes at a very high price, and at the ſame time planted the ſprouts of them.

(*c*) Bath Society, vol. 4. p. 50.

Although I highly approve of carefully preſerving all the ſprouts which can be collected in the ſowing ſeaſon, yet I doubt much whether the entire ſubſtitution of ſprouts in the place of potatoe-ſets, can ever take place, ſo as to ſuperſede the neceſſity of planting a conſiderable quantity of the latter. Doctor Maunſell himſelf has clearly ſhewn, and every man's experience proves, that when ſprouts are put forth, the potatoes are conſiderably weakened, and that *that* weakneſs encreaſes in proportion as ſprouts appear, until the potatoes are entirely exhauſted and unfit either for food or ſeed. The general practice therefore is, to prevent, as much as poſſible, potatoes from ſprouting at all; and when that cannot be done *effectually*, farmers chuſe to let the ſpouts remain and wither; which they will do by turning the potatoes often, ſhaking the mould off, and keeping them in a dry ſtate. The withering of the ſprouts, it is ſaid, prevents or retards new ſhoots; whereby the potatoes are preſerved in a better ſtate for food, than if they were encouraged or ſuffered to put forth many ſprouts. But, ſuppoſing all the ſprouts of potatoes which are brought to view during ſeed-time be preſerved for ſeed, yet the quantity of good ſhoots will fall *far ſhort* of the complement neceſſary for a general planting, inaſmuch as a potatoe, however large and full of eyes, will not, at the firſt ſprouting, put forth more than *one or two ſhoots*. I have had thirty-two good ſets cut from one potatoe; but the general produce of large potatoes (from which *only* ſeed ſhould be taken) is from eight to twelve ſets each, whereas but *one or two* ſprouts only can be obtained from each potatoe. It is to be conſidered alſo, that the poor people's ſowing of potatoes ſeldom commences until May, and continues but a ſhort time; ſo that were they to plant nothing but *ſprouts*, their ſtock of potatoes ſhould be much larger, to produce a ſufficiency of ſprouts, than they generally poſſeſs, or have occaſion for, at that ſeaſon.

I have already mentioned that the preſervation of ſuch ſhoots as can be procured in the proper ſeaſon, without injuring the potatoes as food, will be a conſiderable ſaving of ſeed, and ſo far will encreaſe the national ſtock of proviſions. In this point of view, it is doubtleſs a fit object of *encouragement* by the *Dublin Society*.

Sprouts are fit for planting at any time after they acquire roots ſufficient to ſupport themſelves, independent of the mother-potatoes, which they generally do, when about three inches long; and as the roots encreaſe in number and ſtrength, thoſe parts of the ſhoots between the firſt ſet of roots and the potatoes ſhrink and dry up; and, as I conceive, no more nouriſhment is received from the potatoe by that channel. My happening to obſerve this, gave me the firſt idea of planting ſprouts.

As to the beſt mode of cultivation, I am decidedly of opinion that *drilling* far exceeds all others. But ſprouts may be planted ucceſsfully in all the various methods that potatoes are uſually planted in; but I would not adviſe the ſprouts to be *cut in pieces*, as directed by Dr. Maunſell: it is better to plant them whole, be they ever ſo long, or have ever ſo many ſeries of roots and joints: they may be planted at greater diſtances when left whole. I always found the ſprouts to anſwer when laid *horizontally*, covering them in every inſtance as potatoe-ſets are covered, except on lay-ground, where the ſod intended for covering ought to be *chopped* in the furrow, and thrown up with a *ſhovel*. I diſapprove of planting potatoes on lay-ground; it is the moſt wretched farming. The expence is enormous, the product in general ſmall, and the land very little benefited. I need not tell you how I have ſucceeded with the *drill culture* of potatoes; you have frequently ſeen the produce weighed, and can vouch for me.

If poor perſons can be prevailed upon to ſet ſprouts in drills, and have not the means of horſe-hoeing, the diſtance Dr. Maunſell mentions, of *two feet* between the drills, might anſwer very well, though I ſhould prefer a greater diſtance, and I would plant the ſprouts nearer to each other in the drills; but I by no means think it neceſſary that the ſprouts ſhould be ſet upright. The expence and labour would be greatly encreaſed, if that mode was adopted in *a large plantation*. The ſprouts laid flat, will often ſend up ſhoots from the joints; and potatoes are frequently produced at the joints. Upon examination, it will be found that the roots put forth from the ſprout, near the mother-potatoe, are the chief ſupport of the plant for a conſiderable time. Some few roots will iſſue from the joints, but not in number or ſtrength equal to thoſe firſt put out. Were I to chuſe ſprouts for planting, I would prefer thoſe which had not arrived to an age to have joints. If drills can be *horſe-hoed* (which ought never to be omitted if poſſible) three feet intervals is the beſt diſtance.

I have frequently planted potatoes, and the ſprouts of potatoes, on the *ſame day*, and always obſerved the ſprouts to come up about three weeks *ſooner* than the potatoes; and I am confident, ſprouts will produce as good, if not better crops, than potatoe-ſets, and more ſeldom fail of growing.

Dr. Maunſell recommends his mode of culture for a *ſecond* crop. I am convinced from experience, no good farmer who has land to *plough*, will ever take *two* ſucceſſive crops of potatoes out of the *ſame ground*. But the poor man, who is often confined to a ſmall ſpot, muſt till as he can: broken ground is moſt profitable for potatoes, in every mode of culture; but the poor man, if he has no broken ground, need not fear ſucceſs in planting ſprouts, even on ſtiff lay, provided the ſod be *well chopped* in the furrow, and thrown up with a *ſhovel*.

It is mentioned by Dr. Maunſell, that potatoes raiſed from the apple do not come to perfection in leſs than three years. I know the general opinion is ſo, but I have *proved the contrary*, having frequently had them in full perfection the *firſt* year; but then great attention is neceſſary. The ſeed ſhould be ſown in rich ground, in a ſmall drill like tongue-graſs; and the plants, when tranſplanted, ſhould be frequently hoed like cabbage.

I have had no potatoes for many years but what were originally produced from my own ſowing of the apples; and I have the vanity to think no one has finer. You may remember that, about eighteen years ago, I had, at one time, 105 different kinds of potatoes from the ſowing of five kinds of ſeed.

Dr. Maunſell ſays, there is no uſe in having the ſets of potatoes cut, and let to lie any time before they are planted. I am of a different opinion; not indeed for the reaſon his tiller aſſigns, but becauſe I am convinced a ſet will not ſprout until the cut be healed; and therefore, if the cutting be performed long enough before the ſetting, to allow time for the cut to heal or dry, ſo much time will be gained by the planter; which is a great object, eſpecially to the poor, who are late in planting. Great care ſhould be taken, that the cut potatoes be not ſuffered to lie in a heap, as, from the moiſture which oozes after cutting, they are apt to heat, and produce *curled ſtalks* and a bad crop; which are the certain conſequences of *heated* potatoes.

I gladly take this opportunity of obſerving here, that there is not in our county any ſeaſon when the labouring man cannot get employment. We have no idea of mens going to ſleep when their potatoes are planted. The complaint here is of a contrary nature; the ſpirit of improvement in this country, renders it difficult to procure labourers enough. The picture of the Munſter labourers, as drawn by Dr. Maunſell, is really deplorable, and calls loudly for the hand of power to correct and improve it. It ſeems as if the gentlemen and wealthy farmers of that county were aſleep, if not dead, to the good of ſociety, and the voice of humanity!

In conſequence of my having for upwards of thirty years been employed in making experiments on the culture of potatoes; and the mode I now purſue being conſidered by a particular friend of ours *(d)* as much more profitable than any hitherto practiſed by others; I was not long ſince requeſted by him to give, in writing, a particular account of my management. I did ſo to the beſt of my abilities; in which a minute detail of every part of the buſineſs, from the firſt breaking up the lay to the taking

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(*d*) Colonel Symes, of Ballyarthur, now abroad on the Weſt India expedition, with General Grey.

out the potatoes, is particularly mentioned. I encloſe you a copy of the paper I ſent him: be ſo good as to read it; and if you think it can be of uſe to others, you may diſpoſe of it as you pleaſe.

I am,

DEAR SIR,

Your moſt obliged

and faithful ſervant,

Kingſton, Feb. 2, 1794. THOMAS KING.

Second Letter to Samuel Hayes, Eſq. from Thomas King, Eſq. deſcribing the Mode adopted by him for ſeveral Years in the Culture of Potatoes.

THE following is the paper I promiſed in my laſt to ſend you: to which I have added ſome general obſervations.

The land for drill potatoes ſhould be dry, and cleared of all impediments to the plough. The beſt preparatory crop, if the land be in graſs, is that of lay-oats. The ground ſhould be ploughed, laying the ſod all one way, with a turn-wreſt plough, rather deeper than the ſtaple ſoil, and the oats immediately harrowed in: the crop will in general be very abundant. As ſoon after the oats are taken off as convenient, the ſtubble ſhould be well and deeply ploughed (if with the Kentiſh turn-wreſt plough, ſo much the better). Early in the enſuing ſpring, it ſhould *in dry weather* be well harrowed, and then croſs-ploughed; and previous to planting, ſhould be again well harrowed, and laid as flat as poſſible.

If the land inclines one way much more than another, the drills ſhould run up and down hill, otherwiſe they cannot be effectually moulded on both ſides by the hoe-plough; but if the ground be flat, or not inclining much, then the drill ſhould run north and ſouth. The drills ſhould be three feet aſunder. Having determined that ſide of the field where it is intended to begin, meaſure nine yards from the line of the firſt intended drill, and on the ninth yard, let a row of car-loads of dung be laid from one end to the other, allowing a ſufficient headland at each end for the plough and horſes to turn upon (which headlands, after the horſe-hoeing is finiſhed, may be ſown with turnips, or any other crop ſuitable to the ſeaſon). When the firſt load of dung is laid down, let the next horſe be drawn up, until his head reaches the former load, and in like manner to the end of the row: ſuch a row is a good dreſſing for the potatoes, and a ſucceeding crop of wheat. If the dung be very ſhort, a greater number of loads may be neceſſary: it is better, however, to have *too little* than *too much* dung laid out. In the former caſe, a few loads may be occaſionally added; in the latter, there is great waſte of time and labour in removing the dung out of the way; and if there be too much in the firſt row, or laid too cloſe, it is probable the whole dung of the field muſt be removed. It is ſuppoſed that two Iriſh car-loads contain little more than an Engliſh one-horſe cart-load. The quantity of dung muſt, after all, be regulated by the farmer's diſcretion and ſtock. If he has much potatoe-ground and little dung, he may manure lightly, and ſo *vice verſa*; but for a very productive crop, there ought to be at leaſt *ſome* dung in every part of the drill.

When the dung is all out and ſeed prepared, ſix men and as many boys ſhould be placed along the drill, at equal diſtances. The drills may be made by a good ſwing-plough going and returning in the ſame furrow, in a line perfectly ſtraight, and as deep as the ſoil will permit, obſerving always, that if the ground hangs one way, the laſt ſtroke in opening the drill ſhould throw the mould out *from* the higheſt ſide of the land; which clears the drill much better than when the mould is by the laſt ſtroke thrown againſt the hill: and much depends upon the drill being very clean. Immediately upon the plough's paſſing the firſt boy, in completing the drill, he ſhould begin to ſeed, by dropping ſets, not farther than five inches aſunder in the drills: which (as the potatoes have great room to ſpread ſideways) has been found by experience to be the beſt diſtance. As the drill is ſeeded, each man covers his portion of the ſeed with dung from the firſt row. The ploughman and driver ſhould both be expert in their department. If after the firſt drill is made, the driver walks in, making the ſecond drill quite cloſe to the firſt, and keeps his horſes cloſe up to his ſhoulder, the drills will be exactly three feet aſunder. If the ploughman and driver be not expert, then it will be neceſſary to ſet up marks at due diſtances. By the time the firſt drill is ſeeded and dunged, the plough will have opened another, which will be ſeeded and dunged as the former; and by the time the plough comes to the ninth drill, the firſt row of dung will, or ought to be exhauſted.

It is not neceſſary to cover the drills with *mould* until the entire ſowing is finiſhed. A light harrow, ſomewhat raiſed by being buſhed, ſo as to prevent the harrow-pins from reaching the dung (which it would otherwiſe drag out of the drills) drawn acroſs the drills, will effectually cover them: much better indeed than the uſual method of covering with the plough, and then harrowing to level them; or the drills may be covered by a board edgeways, four inches deep, and four feet long, with a handle like a rake's tail; with which a man may with great eaſe and expedition draw the mould over the drill. Covering with the plough leaves the ground uneven; the potatoes in conſequence come up *not in regular rows*, but ſometimes on one and ſometimes on the other ſide of the ridge formed by the plough: a great inconvenience in horſe-hoeing, beſides the expence. But the whole ſurface being, as directed, laid quite level, the ſhoots will form a perfect row, as if tranſplanted by a line. *Horſe-hoeing* cannot be performed effectually, unleſs the rows *are even*.

Experience proves that the beſt ſeed (cuttings or ſets) is to be had from the largeſt potatoes of every kind. Small potatoes have nearly as many eyes as large ones of the ſame ſpecies. A good ſet, part of a large potatoe, all other things equal, will naturally produce a ſtronger and better plant than part of a ſmall potatoe. Thirty-two good ſets have been taken from one large potatoe, and two-thirds of the potatoe left. Each eye ſhould be cut out by *two* cuts of a ſharp knife; which leaves the ſeed ſtronger than is generally done by the common way of cutting, or rather ſlicing off the ſet with one cut of the knife; beſides many more ſets will be obtained. If the potatoes are large, there will remain, after taking the ſeed, *ten or twelve ſtones out of twenty*; which may be profitably uſed for *pigs*, *cows*, or *horſes*. No part ſhould be cut which has not a very apparent eye in it; nor is the ſtalk-end of a potatoe good for ſeed.

If the ſeed after cutting ſhould be ſuffered to lie in a heap, *it will heat*, and if not totally deſtroy, at leaſt weaken it ſo, as to produce *curled ſtalks* and a poor crop. Curled ſtalks will proceed from any other cauſe which weakens the vegetative power before ſowing, or when the plant is in a ſtate of growing. The principal cauſes are, laying potatoes together in too large quantities in a wet or damp ſtate, repeated ſprouting before planting, and by worms wounding the young ſhoots: by which laſt means much miſchief has been done.

When the potatoes are up ſo as diſtinctly to ſee the entire drill, the mould ſhould be turned from the plants by a light ſowing-plough with a clavis; at firſt from one ſide of the drill only; and in three or four days, when that mould is returned, then from the other ſide. In this firſt operation the plough ſhould run as cloſe to the plants as poſſible. If both ſides were ſtripped at the ſame time, and unfavourable weather happen, the plants would be materially injured.

Previous to the ſecond horſe-hoeing, which ought to be done in about a week from the former, it would be adviſable to uſe the Cultivator, Nidget, or Shim, as it is called in different places. This inſtrument, run between the drills, cuts all weeds in the intervals, and raiſes mould for the next horſe-hoeing. If any weeds ſhould appear in the row, they ſhould be carefully picked out by hand.

The horſe-hoeing, by which is meant the throwing up mould out of the intervals to the plants in the drill, ſhould be performed at leaſt four times; each time going and returning in the ſame interval; that is, once from and three times to the plants: but the oftener they are horſe-hoed the better, unleſs the planting is very late; then horſe-hoeing keeps the potatoes too long in a growing ſtate, and there is not then time for them to ripen fully.

Potatoes have been horſe-hoed when in full bloſſom without receiving any injury.

If the horſe-hoeing be performed with one beaſt, it ſhould be a very ſtrong one; if two are uſed, they ſhould both draw from the ſame ſwingle-tree; the fore horſe's traces being proportionably long and kept from falling at the turn, by a ſtrap over the hinder horſe's neck. The work, if well performed, and with a moderate degree of expedition, is too heavy for one horſe.—A plough with a double mould board ſhould be uſed for finiſhing: it ſhould be very narrow in the ſole, the mould boards high, and at the upper part as wide behind as the interval, ſo as to preſs the mould home to the ſtems of the plants on both ſides at the ſame time. Near two Iriſh acres may be planted in a day by one plough and the number of men and boys before mentioned. A ploughman and driver may horſe-hoe an Iriſh acre in a day. The intervals, when finiſhed, ſhould reſemble a celery-bed; deep at leaſt as the ſtaple mould, and neatly cleaned up on both ſides. A plantation of potatoes thus managed, may reaſonably be expected to produce 160 barrels, of 20ſt. 14lb. each to the barrel. A ſquare perch has frequently produced 25ſt. which is 200 barrels an acre; and this aſtoniſhing crop is the beſt preparation for wheat, which never fails being a profitable one; beſides highly improving the ſoil afterwards.

After a great variety of experiments to take out potatoes, the beſt method I have found, and I have tried many ways, is that which follows:

If the drills be lower at one end of the field than the other, which in this country is generally the caſe, let as much be dug in the common way with the ſpade from the lower end of the drills, as will give room to a plough and pair of horſes, yoked in the common manner, to return, leaving men and boys between the plough and drills. Two or three yards will be ſufficient; but the ends of the drills ſhould be brought even, that the plough, going acroſs them, may take an equal proportion off each drill. Six men placed at equal diſtances, each having a boy or girl to attend with a baſket, will be ſufficient to keep a plough conſtantly going. The potatoe-tops ſhould be pulled up, and with ſuch potatoes as happen to be drawn up by them, gathered and carried off before the plough begins. Let the plough, croſſing the ends of the drills, cut off a portion, as much as is turned in common ploughing; the men with their tools (three-pronged forks are beſt) then throw the part cut off clean out from the unploughed part, pulverize the ſoil, and caſt out the potatoes for the pickers, who are to carry them off to the carts. The plough having made one cut, returns empty behind the men very expeditiouſly, and enters upon another cut juſt at the time the firſt man has his ground cleared, and ſo round and round until the whole is finiſhed; by which means theſe ſix men are kept conſtantly buſy, and with the plough do double the work which could be accompliſhed any other way: beſides the advantage of taking the potatoes out without cut or bruiſe, of leaving none behind, and of mixing the manure with the ſoil moſt effectually. If the potatoes be in very great abundance, an additional man will be neceſſary. Different kinds of potatoes in the ſame plantation may without difficulty be ſeparated. Carts ſhould attend to take away the potatoes as they are gathered. Very tolerable crops of potatoes have been obtained by the drill culture without dung, if the ſoil be moderately limed.

The quantity of dung neceſſary for an Iriſh acre of drilled potatoes is about one hundred cart-loads, and five barrels of potatoes for ſeed, called in other places cuttings or ſets, of which at leaſt, *one third* of the weight may be ſaved by cutting out the eyes, as before directed. It takes to plant an acre by the ſpade, in ridges, nearly *four hundred* loads of dung, and *thirteen* barrels of ſeed at leaſt.

The whole expence of an acre of drilled potatoes comes under five guineas; the expence of an acre planted in the common ridge way, on lay, amounts to fourteen pounds.

The land is more improved by a drill-crop, with one hundred loads of dung, than by four hundred in the ridge way. Three drills are equal in produce to the beſt ridge, and generally much better. Drilled potatoes are much better food. I once ſold the produce of an acre of potatoes for upwards of *fifty-two* pounds.

I believe I may venture to ſay, I have improved the drill-culture of potatoes, in ſeveral inſtances. By repeated trials, I found the proper quantity and due diſtance dung ſhould be laid down at:—By drawing out the dung before any drills are made (contrary to the uſual practice) ſuffering nothing to touch the drills when opened until they are ſeeded and dunged, and then covering them by croſs-harrowing. Every perſon who has ſeen my method of taking out potatoes, highly approves of it.

The common method, of depending entirely upon ploughing along the drills, has been proved by me to be ineffectual, beſides a great loſs of time: many potatoes are thereby left buried, to the great injury of the future crop.

The labourers firſt at one end, and then at the other end, wait for the plough; and the plough as often waits for the men: ſometimes too much employment for the men, and ſometimes too little; ſo that I am convinced, the ploughing out lengthwiſe of the drills, is of all modes the worſt; and ploughing croſswiſe, as before deſcribed, the beſt. More than one half, and by much the weightieſt part of the labourers work, is performed by the plough in my way; that is, the act of digging and throwing out the ſpit or ſpade full; the lighter part, that of ſearching for, and throwing out of the potatoes, remains only for the men, who though they are always buſy, they are not overworked.

I have been informed by a gentleman from near Liſmore, in the county of Waterford, that the manner of preſerving potatoes there, which is done in a maſterly way, is to keep them on hurdles, raiſed high enough off the ground, to give room for the mould which falls from the potatoes in turning, which is done frequently, and leaves alſo a free paſſage to the air under them. I have not yet tried this method; but I have ſeveral times ſeen potatoes from that country, late in ſummer plump and ſmooth, perfectly clean and dry, without any appearance of their ever having ſprouted.

I am,

DEAR SIR,

Your moſt faithful

and obliged ſervant,

Kingſton, 4th February, 1794.

THOMAS KING.

Extract of a Letter from Mr. King to Mr. Hayes, on the Culture of Potatoes.

"NO ſoil or ſituation could be found more diſcouraging for wheat than the Brow in my little farm; the improvement of which you have ſo often commended, that I am induced to ſtate the whole progreſs. If you think it irrelevant to the preſent inquiry, I requeſt you will throw it aſide.

"This piece of ground hangs over our river, and contains about two acres; is very ſteep, and was covered for ages, as I have reaſon to believe, with a thicket of furze, thorns, and briers, ſo matted together as to be impenetrable to man or beaſt. For many years I neither knew the extent or ſhape of it. At length I ſet fire to the thicket, and then found the ground extremely ſteep, but of very uneven ſurface, with many large granate ſtones; and in ſeveral parts quarries ſwelling above the earth. The ſoil appeared exceedingly poor and ſhallow. There were a few birch trees ſcattered, which eſcaped the fire. To preſerve and encourage the growth of theſe was one principal inducement to clean and dreſs the ground. I had the traſh grubbed out; and the ſurface being all nearly broken up in this operation, the remainder was pared, and, with the roots of briers, &c. burned. After blaſting and removing the granate ſtones, quarrying off the protuberances, and levelling down the hillocks, I had rye ſown and covered by trenching, in an horizontal direction. I had a very good crop of rye. When that was removed the edges of the furrows were dug and levelled with the ſpade. In the proper ſeaſon dung for potatoes was laid in a row on the top of the bank, from whence it was caſt over the whole piece, and, with ſome trouble, ſpread. Potatoes were then planted in beds or ridges by a line; the ridges ſix feet wide, with three feet furrows, on which the firſt ſpit or digging was thrown up. I wiſhed to lime lightly, and lay down this ground for graſs as ſoon as poſſible; but as no horſe could draw on any part of it, or even walk on it with ſafety before the firſt digging of the potatoe furrows; and as the expence of carrying the lime by labourers would have been very great, I was for ſome time at a loſs; but taking advantage of the *furrows* in this ſtage of the buſineſs, I procured a pair of cleves or baſkets, ſuch as are uſed in the mountains; and they anſwered my purpoſe. The horſe which carried the cleves was taken down the ditch at one end of the ground, and turned into a furrow, along which he could but barely walk with ſafety. When the lime was laid down the horſe went forward, and out of the other end. In that manner I got the intended quantity of lime out, which was immediately ſpread upon the ſoil which had been thrown up on the potatoe-ridges. Soon after, the furrows were dug a ſecond time, and ſhovelled on the lime; which finiſhed the potatoe planting. The potatoes were very good; but in what manner to lay down the ground puzzled me a good deal. To let it lie for a ſpring crop would require a freſh ſtirring, and the expence of digging would not anſwer; nor could the ſurface be laid ſmooth. I determined to lay it down with wheat at once, not indeed expecting a profitable crop, from the lightneſs and ſhallowneſs of the ſoil; but I did not know what better to do. I had taken great pains to have briers, fern, &c. cleared off by the burning; but, notwithſtanding my utmoſt exertions, great quantities appeared in the potatoes. Previous to digging the potatoes, I had the higheſt ridge cleared of potatoe-ſtalks, briers, &c. and raked with a ſtrong iron rake, and then ſown with wheat. Two men proceeded to dig that ridge; the potatoes of which rolled down, and were ſtopped by the furrow next below, the brier, fern-roots, and other weeds being ſtill caſt downwards.

When part of the next ridge was cleaned and ſown as the former, two others were began; then caſting their potatoes, roots, &c. to the ridge next below them, and levelling and dreſſing the furrows above them. Thus the work went on until the whole was accompliſhed. As the men proceeded, all unevenneſſes were ſmoothed with a rake; and no one trod on any part of the ſown ground after the potatoes were dug; the potatoe-pickers ſtill ſtanding on the undug ridge. In the ſpring following, I had a good quantity of graſs-ſeeds ſown, and prevailed upon three labourers to harrow them in on the growing wheat; though a very difficult operation. The ſmall ſtones were picked off the ſurface, but not rolled. I had the ſatisfaction of finding my improvement to ſucceed beyond my moſt ſanguine expectation; the wheat yielded a wonderful crop, conſidering all circumſtances; and the graſs-ſeeds throve to admiration. The wheat was rather thin, but well headed; the graſs-ſeeds, which conſiſted of a little White Clover, Trefoil, Ribgraſs, and the common Meadow-graſſes, grew upwards of a foot high before the wheat was reaped, and was ſo luxuriant as to lodge under the wheat without throwing any of it down. When the wheat was removed, being unwilling to loſe ſo great a quantity of fine graſs, I bought ſome mountain ſheep, which were fed upon that and about two acres and a half adjoining, laid down with wheat and graſs-ſeeds at the ſame time. I ſold the ſheep, ſoon after Chriſtmas, for nine pounds profit. During the progreſs of this little improvement, I was a ſubject of ridicule for the whole country; the expences being conſidered very great, and no proſpect of any return. For the firſt time in my life, I kept an account of the expence (which at preſent I cannot find); but know that my three firſt crops conſiderably more than reimburſed me all previous expences, excluſive of my profit on the ſheep. I muſt add, that I have enlarged my farm by two acres, now worth a guinea and an half an acre, which before were not worth one ſhilling.

The labour in improving this piece of ground was great, and the work tedious, owing to the difficulty of ſtanding to dig on moſt part of it. Great care was taken in digging out the potatoes to pulverize the ſoil, and mix the lime well with it.

The following Queries on the Culture, &c. of Potatoes, as ſent from the Right Honourable and Honourable the Board of Agriculture, London, anſwered by Samuel Hayes, of Avondale, in the County of Wicklow, Eſq.

QUERE I. "What are the expences and produce of an acre of potatoes "cultivated on ſoils that will yield wheat—and alſo, on "ſoils that will not yield wheat?"

If the beſt mode of cultivation be adopted, viz. in drills, and horſe-hoed with a light ſeeding-plough, the expence will be about five guineas and an half.

The particulars in this part of the country, where the price of manual labour is rather higher than in moſt other parts of Ireland, will be found to be pretty nearly as follow:

	£.	s.	d.
Ploughing an Iriſh acre (which is about an acre and a half Engliſh) after oats on the lay, with four bullocks or horſes, two days	0	12	0
Second ploughing, ditto	0	8	0
Two harrowings	0	5	0
About 110 Iriſh car-loads of farm-yard manure, which is about fifty-one one-horſe Engliſh cart-loads, at 3d. per load	1	7	6
Expences of drawing ditto, about	0	9	2
Labourers loading and laying down the manure (four) at 9d. per day	0	3	0
Six barrels of White-eye potatoes, each eye cut out by two cuts meeting each other, at 4s. 4d. per barrel of twenty ſtone, 14lb. to the ſtone	1	6	0
Three men cutting the ſeed	0	2	3
A plough with two horſes, to mark the ridges, half a day	0	3	0
Covering the drills with an harrow	0	2	2
A man to follow ditto, making good deficiencies	0	0	9
The two firſt horſe-hoeings, with one horſe and a light plough, an acre per day	0	6	6
The two laſt horſe-hoeings, with two horſes, two men and a boy	0	9	9
Two men or three boys, for hand-weeding	0	1	6
Six men and ſix boys ſpreading manure and laying the ſeed, half a day; the men 9d. the boys at 6d.	0	3	9
	£. 6	0	4

The ploughing out, as deſcribed in Mr. King's letter to me, on the culture of potatoes in drills, which accompanies this, and to which I beg leave to refer, comes to about 1l. 16s. The expences of preſerving them in pits may be ſaved by thoſe who have ſufficient houſe-room; but *pitting* is certainly the beſt way of preſerving potatoes, if they are put in dry, on a ſound dry bottom.

The produce of an Iriſh acre of *White-eye* potatoes, well cultivated in drills, in a middling good ſoil, will not be leſs than 150 barrels, of twenty ſtones each, 14lb. to the ſtone.

Mr. King had 300 barrels off two acres laſt ſeaſon (I was preſent at digging out) and weighed twenty-ſeven ſtones and an half, of 14lb. each, off one perch of twenty-one feet ſquare, which would amount to 220 barrels the acre; and I am confident there were very many perches in the field which contained full that quantity; but in ſome other parts, the ſprings (which had burſt out after violent rains) had injured the crops. I have had myſelf 185 barrels to the acre of this ſpecies of potatoe, which on good dry land are a ſound wholeſome food; but without a tolerable ſoil and attentive culture, ſuch crops cannot be expected.

About 120 barrels may be conſidered as a good produce on an average, and not quite ſo much from any other ſpecies of potatoe.

Potatoes certainly may be cultivated in ground too moory, ſtony, or too much covered with bruſh or furze to afford wheat in the firſt inſtance. In ſuch ground the potatoe muſt be produced in the common ridge and furrow, or *lazy-bed* way; their crop is often very conſiderable in ſuch circumſtances, with a ſufficient quantity of good dung, and ſome ſoils with lime or aſhes; but the manual labour is very great, and conſequently the expence; the advantage, however, will be, that after ſuch preparation, *wheat* (*a*) may be ſown with almoſt a certainty of ſucceſs, which could not be equally enſured by any other preparatory crop.

QUERE II. "What is the value and quantity of manure applied to an "acre of potatoes?"

The value of manures depend ſo much on local circumſtances in Ireland, that it is very hard to fix any thing like an average. In moſt parts of the

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(*a*) There is a remarkable inſtance of this on a part of Mr. King's farm; the particulars of which are ſo much in favour of uſing potatoes as a meliorating crop, and for the purpoſe of reclaiming rough uncultivated ground, that I take this opportunity of laying them before the Board, in a letter from him to me, juſt as I received it.

county of Wicklow, there is neither marl nor limeſtone; the latter is frequently brought in lime as a manure from the diſtance of thirty Engliſh miles; dung is therefore the general reſource, and from what an Iriſh carload is valued at, may be eſtimated at 8d. for the load of an Engliſh one-horſe cart. Tolerable crops have been had from marl and lime, but not equal to thoſe from dung. In ſome parts of Ireland they have lately got into the habit of burning the ground as a manure for potatoes: this injures the land almoſt irreparably, and deſtroys one great object of the potatoe-culture, viz. that of introducing them as a *meliorating crop*.

The quantity of manure neceſſarily depends on the method of culture; if in drills, 110 car-loads, ſuch as I have before mentioned, will manure an Iriſh acre; but if in the ridge and furrow way, it will require 373 ſuch loads, viz. a load to every perch of the ridge of twenty-one feet in length; that being the number of ſuch perches in an acre, ſuppoſing the ridge ſix feet wide, and the furrow three. By this we ſee, that the ſame quantity of manure neceſſary for one acre in the lazy-bed way, will anſwer for full three acres in the drill culture.

QUERE III. "What is the method of culture found moſt productive?
"Do they tend to ameliorate or impoveriſh the ſoil?"

If the ſaving in ſeed, manure, and labour, together with the improvement of the ſoil, be taken into conſideration in aid of the actual value of the crop, there is certainly no method practiſed in Ireland that can ſtand in competition with the *drill culture*. For the beſt mode of carrying it into execution, I ſhall beg leave to refer, as before, to that very ſatisfactory detail given by Mr. King, in his ſecond letter to me, as publiſhed laſt year by the Dublin Society, at the end of Dr. Maunſell's Treatiſe on the Production of Potatoes from the Shoots. I ſhall only obſerve, that Mr. King, whoſe character as an experimental and practical farmer ranks very high in this county, and who has himſelf been long in the habit of planting all his ſhoots for the purpoſe of raiſing potatoes; though he conſiders the public much indebted to the above reſpectable and well intentioned gentleman, for recommending ſo forcibly, from theory and practice, the uſe of ſhoots, which have in general been thrown away as unproductive, is yet of opinion, that the mode can never be practiſed to any great extent, as a ſufficiency of ſhoots for a *general crop* can never be expected without injury to the potatoes as *a food*; having always obſerved, that when theſe roots are put up dry, and properly managed through the winter, the quantity of ſhoots, on many of the ſpecies of potatoe, will be found very *inconſiderable* indeed; inſomuch, that Mr. King on opening his pits laſt year, in order to plant four acres, had not a ſufficiency of ſhoots for four ſquare *perches*. Thoſe who delay their planting to a very late ſeaſon, may find, no doubt, a greater quantity; and it is alſo allowed, that where no attention is paid to the root as a *food*, that by particular management, ſhoots may be obtained during the winter, for the purpoſes of producing very early potatoes as a luxury for the table, where they can be planted ſafe from froſts in ſpring.

From every obſervation I have made, and from the concurrent opinion of every farmer I have converſed with on the ſubject, I am decidedly of opinion, that potatoes are a truly meliorating crop in every ſpecies of culture. It has been remarked, that on the ſea-ſide of this county, where ſucceſſive crops of corn have been taken by negligent farmers, from lands *once marled*, till the ſoil has appeared perfectly *exhauſted*, that by planting potatoes in the ridge way, without any manure, not only a good crop has been obtained, but the land has produced *wheat* and *oats for the two following years*; and in other ſituations, where the ground has been deeply ploughed and burnt for a crop of rye, and the land in conſequence left in ſuch an impoveriſhed ſtate as ſcarcely to produce a blade of graſs, ſtrong ſhooting potatoes, ſuch, for example, as Turks or White-eyes planted, though *without manure*, have enabled the ground to give a ſucceeding crop of oats.

QUERE IV. "What is the average value of a buſhel 75lbs. weight?"

The average value in this county may be conſidered as 1s. 2d. Iriſh currency; about 1s. 1d. Engliſh. For a few weeks in ſummer it is generally ſomewhat greater.

QUERE V. "What is the weight of potatoes which a man, his wife,
"and four children conſume in a year, ſtating what
"other food is eat in ſuch a family?"

Nineteen ſtone of potatoes is a good allowance for ſuch a family for one week; this not only feeds them, but allows ſomething to be thrown to a few fowls, their dog, and a pig; which latter is generally raiſed from ſix ſhillings value to twenty ſhillings in *ſix months*. With the above potatoes the labouring poor have very little other food: they uſe butter-milk in general at breakfaſt and ſupper; but this differs very much from what is generally known by that name in England, as the dairy-women in this county, who are reckoned very excellent in their way, ſave all their beſt milk for the churn, and never ſkim off the cream, nor draw away the thin milk; and the whole thus churned together, produces a butter-milk not only nutricious and remarkably wholeſome, but for ſome days after churning very palatable and agreeable.

At their dinner, thoſe who have cows afford themſelves butter or ſweet milk, or at times herrings caught on this coaſt, and ſaved by themſelves at a very cheap rate, five being generally procured for two pence. During a part of ſummer they are generally obliged to buy oatmeal, when their potatoes are gone: about 2 cwt. or 16 ſtone is in general the quantity required during that time for ſuch a family as above ſtated: this is made into a ſort of pudding, or thick porridge, called Stirabout. Very little is made into bread in this county; and it is ſeldom uſed more than once a day, as during this ſeaſon rye or wheat bread is generally eaten at dinner, though potatoes would certainly be preferred, if they could *procure* them.

Mr. King conſiders the annual conſumption of potatoes in ſuch a family to be about forty barrels, of twenty ſtone each. Dr. Maunſell rates it at fifteen Munſter barrels, of forty-eight ſtone each, or thirty ſix of our barrels, ſo that we may fairly ſuppoſe the quantity about forty barrels: this is rather *more* than the cottagers in this county can produce on the grounds which are uſually let with their holdings, though, in order to *extend* their manure, many of them, convinced of its great utility, have adopted the *drill* culture.

An ingenious gentleman, who, from his connexion in the county of Waterford, and of the firſt counties in Ireland for the production of this root, ſeemed particularly enabled to give information on this head, has obliged me with the following obſervation, viz. that the nouriſhment from one pound of good houſehold wheat bread is equal to that from five pounds of the beſt ſort of potatoes. This was firſt ſuggeſted to Mr. Braughall, the gentleman above mentioned, from a Memoir written on the ſubject, by Monſieur Parmentier, a French chemiſt, and has ſince been ſupported by many corroborating circumſtances. Mr. Braughall having obſerved, that whatever weight the ſhilling *houſ.hold loaf* conſiſts of in Dublin, five times that weight of *potatoes* may have been bought at that time for the ſame ſum; and if by any cauſe the price of potatoes ſhould riſe above that proportion with reſpect to bread, the lower claſs then decline the purchaſe of potatoes, experience having taught them the cheapeſt mode of ſupport.

But, as I before obſerved, that in the country parts of Ireland the fowls, pigs, and dogs come in for their ſhare, there is certainly more conſumed than *five times* the quantity of *bread* which might be neceſſary; but it is far from *thrown away:* the family by this means eat none but the ſoundeſt and moſt palatable potatoes, whilſt the refuſe ſupply equally the wants of the other animals. We muſt alſo add, that another cauſe of increaſed conſumption ariſes from the univerſal practice of allowing the little children of the houſe to roaſt potatoes for their own uſe as often as they pleaſe, in the turf or wood aſhes. As you ride by a cottage, you frequently ſee a group of children run to the door, each one holding in his hand a roaſted potatoe; and to this facility of procuring plenty of wholeſome ſuſtenance at this ſtage of life may be attributed the robuſt health of our peaſantry, and the great population of our country.

QUERE VI. "What is the beſt mode for preparing potatoes for food?"

The potatoe is found to make excellent ſtarch, if only ſcraped or pounded, and paſſed through a ſtrainer, which would anſwer for hair-powder; it alſo produces the fineſt flour poſſible, which makes cakes, paſtry, and puddings to very great perfection; but it has not yet, by any proceſs I have ever heard of, been wrought up in bread to any advantage. They are good food ſliced raw, and fried; roaſted ſlowly, or baked in an oven; but boiling is not only the moſt general, but, on the whole, the beſt mode of preparing them for food. However, to have them in the higheſt perfection (as I have been informed) it is neceſſary to obſerve the following directions: The potatoes ſhould be ſorted, ſo as to have the large and ſmall boiled each by themſelves. When waſhed very clean, which is beſt done by the uſe of a birch-broom in a pail of water, or ſtill better in a *baſket* under a ſpout of water, they are to be put into a pot, without peeling or ſcraping, and with leſs *water* than is ſufficient to *cover them*, as the potatoes themſelves will produce a conſiderable addition of fluid before they begin to boil. If the potatoes are tolerably large, it will be neceſſary, as ſoon as they begin to boil, to throw in ſome cold water, and occaſionally to repeat it, till by trial the potatoes ſhall be found to be boiled quite to the heart: they will otherwiſe crack and burſt to pieces on the outſide, whilſt the inſide will be nearly in a crude ſtate, and conſequently very unpalatable and unwholeſome food. When boiled, they muſt be poured into a baſket which will let the water drain off inſtantly, as they become quite inſipid if they remain in the water after boiling. They ſhould continue together a little further time to dry, and are then in perfection. To the neglect of theſe attentions it is obſerved, that good potatoes are leſs frequently ſeen at the tables of thoſe who keep a profeſſional cook, than on the wooden bowl of the cottager.

QUERE VII. "Which is the beſt ſort of potatoes now in uſe?"

The number of kinds are ſo conſiderably increaſed from ſowing the ſeed contained in the potatoe-apple, and confounded by local appellations, that it is difficult to convey accurate information on this head. The favourite potatoe at preſent in this country, for a general crop, ſeems to be the White-eye: a large round root, of a red colour, with the eye ſunk very deep in the white blotches. The quantity produced by this potatoe in the drill culture, far exceeds any other I am acquainted with; and on a dry ſoil ſufficiently fertile to bring them without much manure, they are ſound and well taſted, though much inferior in point of flavour to all ſorts of potatoes which are long and flat. The beſt of theſe latter were formerly known by the name of the Spaniſh or White Kidney potatoe, that is now very rarely to be met with; but we have lately diſcovered a potatoe which, though not quite ſo ſmooth and fair on the outſide, has all the merit of the Spaniſh, with the additional advantage of coming into uſe the earlieſt of any yet known, and producing, in ſome ſoils, a very great crop. It is a very long flat potatoe, with very few eyes, and thoſe ſcarcely ſunk in the ſurface; and has a roſe-coloured ſpot on one end, and ſometimes on the ſide. It is known by the name of the Wicklow Banger; has been in uſe in this country for the very early crop, about ten years; is ſuppoſed to have come originally from England, but from what part it is uncertain, as they were got out of a ſhip that was ſtranded on our coaſt, and all the men loſt. It is inconceivable what ſums of money our induſtrious farmers have made of this uſeful root, by the ſupply of the Dublin market; where they frequently have got upwards of a ſhilling a pound. They plant theſe potatoes in a black moory but rich ſoil, in November, in the ridge and furrow way; and with a little attention to cover the ridges with ſome coarſe litter in ſevere froſt, are ſure of a crop about the firſt week in June, ſufficiently forward to dig. They either ſet back the ſtalks as they dig, which produces them a tolerable ſecond crop at the end of the ſeaſon, or they dig all out and prepare the ground for turnips, to be followed by wheat or barley, according as the turnips are eaten off before or after Chriſtmas. They have thus three valuable crops in ſucceſſion in the ſhorteſt time poſſible, and the ſoil rather meliorated than exhauſted.

The ſpecies of potatoe next in eſteem to the Banger, is called here the *Engliſh White*, or *London Lady*: it is a ſmooth fair potatoe, and generally flat, but not ſo long as the former. This comes in early, but at its very firſt digging is rather ſoft and watery: their bad qualities laſt but a very few weeks, and then it is found to be of more general family uſe than any other we know of, producing great crops, and laſting in perfection till the month of February; at which time the White-eyes may be properly uſed, and will continue good till the beginning of May; when a ſpecies called the Apple, which ſeems to be only a variety of the latter, being round and reddiſh, ſomewhat variegated with a paler colour, but without ſuch deep eyes or blotches, ſucceeds, and will continue perfectly ſound, and fit for eating, actually until the beginning of September. Thus we ſee the provident farmer may, with a little attention, be provided with potatoes for a conſiderable time after the new are fit to dig for general uſe.

Conſiderable quantities of White-eyes and Apple potatoes may be had in this county; the White-eyes, at preſent, five ſhillings Engliſh per barrel, of twenty ſtone; the Apple, about ſix ſhillings and ſixpence: the latter probably cheaper, at this time, at Dungarvon or Youghall.

The Bangers, which are only to be had in this country, are now ten ſhillings the barrel, as the demand is always very great for them, in order to plant early for the Dublin market. No great quantities of theſe could now be procured; and potatoes in general are likely to be very dear between this time and the coming in of the new crop. The Engliſh White, which we conſider as originally coming from Lancaſhire, are perhaps to be better procured at Liverpool than in Ireland.

In ſome places they cultivate a black potatoe, of the ſhape of a White-eye, with ſometimes a very dry, but yellow coloured inſide: it has rather a ſtrong earthy flavour, but as it is very hardy, grows with little manure, is ſingularly productive (the ſtalks continually throwing out young potatoes, even to the ſurface of the ground) and laſts long in a ſound eatable ſtate. I am of opinion, it might be introduced in ſoils and ſituations where the before-mentioned kinds would not anſwer near ſo well.

I have now mentioned all the kinds of potatoes which I think neceſſary for the ſeveral purpoſes of *early* and *great produce*, or long continuance. There are ſeveral others in different parts of the kingdom of various names, which would, perhaps, be as ſtrongly recommended by their ſeveral admirers; but as I conſider thoſe I have mentioned as forming a perfect aſſortment, viz. The *long*, *flat*, *ſmooth* kind for *early uſe* and ſuperiority of *flavour*; and the *round ſorts* for great *produce* and *long laſting*, I think it unneceſſary to extend this detail, already too long, I fear, in proportion to its merit: it has *that*, however, of being founded on experience, advancing nothing but what can be ſupported by proofs, and ſubmitted to the Engliſh Board of Acriculture, with the beſt poſſible intentions of furthering their laudable deſign of bringing the culture of this uſeful vegetable into more general practice, and thereby providing a *cheap* and *wholeſome* food for the *lower claſſes of the people.*

Avondale,
March 22, 1795.

SAMUEL HAYES.

No. IV.

Remarks by James Crowe, Eſq. of Lakenham, near Norwich.

THIS ſeaſon has given me an opportunity of experiencing, that potatoes are well preſerved by keeping them in the ground where they grew, and ſo avoiding a great expence and loſs in putting them into trenches, pits, &c. My potatoes now dug out of the ground are as ſound and as good as at Michaelmas time; between which and Chriſtmas I ſold about two-thirds of my crop, and placed the ſtraw which aroſe from them on the remainder; which I have found a ſufficient protection againſt all the ſevere froſts we have had. My ſoil, you know, is a light loam. Sir John Sinclair obſerves, potatoes can be grown for about 10l. per acre. I wiſh this could be clearly ſhewn; for I cannot grow them under about 15l. per acre. I cannot think they are a proper food for cattle, from this circumſtance, and from their exhauſting the land moſt wonderfully. I have laid on twenty loads Norwich dung on an acre of wheat-ſtubble, which had been dunged with twelve loads of farm dung for the wheat crop (twenty-four buſhels I call a load). The land was then planted with potatoes, of which I had (of the beſt eating ſort, which we call Mealy White) about 400 buſhels; and then the land in the next ſpring was ſown with barley, and found to be not too rich for that crop:—a proof to me that potatoes ſhould only be cultivated in the neighbourhood of towns where foreign manure can be obtained; and indeed, if not given to cattle, in no other ſituation will they be wanted. I have for many years grown here a few acres of potatoes; ſold them conſtantly for 1s. per buſhel, without ever finding much profit.

	£.	s.
Twenty loads of dung	5	0
Three times ploughing, and eight times harrowing	0	16
Twice hoeing, and drawing earth to the plants	0	12
Eighteen buſhels of potatoes to ſet, cutting and planting them	1	15
Taking up, and loading (ſuppoſe 400 buſhels)	1	16
Carting to and ſelling at Norwich	2	2
Rent, tithe, and pariſh charges	2	10
Intereſt of money	0	7
Per acre,	£. 14	18

	£.	s.
400 buſhels, at 1s. is	20	0
Expences	14	18

£. 5 2 profit; but from this I muſt deduct for failure in the quantity. Some years I have not had more than 300 buſhels, without ſelling them dearer.

No. V.

ON POTATOES AND THEIR CULTURE;

In anſwer to the Queries from the Board of Agriculture.

By James Anderſon, L. L. D. *&c. Feb.* 23, 1795.

THERE are ſo few facts known with *certainty* reſpecting the potatoe, that I ſhould perhaps have declined troubling the Board with any thing elſe than a few general remarks, in anſwer to the queries on that ſubject, had it not been with a view to guard againſt the effects of that torrent of miſinformation which, I can eaſily foreſee, will be poured in upon the Board from all quarters in conſequence of theſe queries; for men, when they have formed no accurate ideas on a ſubject, for the moſt part lay hold of particular facts, from which they draw general concluſions that favour the notions they had previouſly formed; and as different perſons cull out partial facts in this manner, and argue upon them without diffidence, the concluſions that will reſult from an aggregate maſs of ſuch information, muſt, in many caſes, be ſo contradictory to each other, as to occaſion only perplexity and confuſion.

The potatoe is doubtleſs the moſt valuable eſculent that is known in this climate, and highly merits a degree of attention for diſtinguiſhing its different varieties, and aſcertaining with preciſion the peculiar properties of each kind; which it never yet has obtained, nor is likely to obtain, unleſs it be by means of the Board of Agriculture, or ſome ſuch patriotic inſtitution, becauſe of the expence and trouble that attend the making of the neceſſary experiments, and the extreme accuracy with which they muſt be made, before they can be of any ſervice to the practical farmer; who, till that be done, muſt continue to wade on, as he has hitherto done, in the dark with regard to many of the moſt eſſential circumſtances that ought to regulate his conduct.

I myſelf have made a few experiments on this ſubject; which have been barely ſufficient to point out ſome of the circumſtances that are wanted. I intended to have gone farther, and proceeded ſome length, in order to aſcertain the wanted facts; but to do it with the requiſite preciſion, required aſſiſtants and conveniencies that my ſituation did not afford, and I was obliged to deſiſt. It is, however, the concluſions deducible from theſe experiments that will form the principal ſubject of the following pages. In theſe Remarks I ſhall adhere nearly to the ſame order as the Queries point out.

QUERE I. "What are the beſt kinds of potatoes, and the beſt mode "of culture?"

This reſolves itſelf into two queries, which, for reaſons that will ſoon appear evident, muſt be conſidered ſeparately.

As to the beſt kinds of potatoes, no anſwer can be given to this query, in the preſent ſtate of our knowledge, that can prove intelligible, unleſs it be to perſons who live in the immediate vicinity of the perſon who anſwers it. In every diſtrict there are local names for particular kinds of potatoes there cultivated, which are known nowhere elſe; ſo that to name them conveys no ſort of idea whatever to a ſtranger, but, what is worſe is, that the ſame name often occurs in different parts of the country, denoting potatoes of qualities extremely different from each other; ſo that a perſon truſting to names, might get perhaps a dozen of different ſorts, while he thought he was getting only one kind. Even under the ſame name, in the ſame neighbourhood, he may get two kinds of very different qualities, owing to an unobſerved circumſtance that I ſhall ſoon have occaſion to explain; ſo that no information whatever can be conveyed to thoſe at a diſtance by means of the name only.

If that name ſhall be accompanied by a deſcription, the caſe will not be much altered. I have ſeen half a dozen or more potatoes ſo exactly reſembling each other, that no perſon could have diſtinguiſhed one from the other; yet each of them was extremely different from all the others in ſome of its moſt eſſential qualities. This circumſtance is ſo little attended to by thoſe who rear potatoes, that it ſeldom happens that you can buy a buſhel of potatoes without meeting with ſeveral ſorts, which is for the moſt part the cauſe of that diverſity of taſtes, &c. that are found among potatoes out of the ſame diſh, in uſing them at table.

It is now generally underſtood, that the different *varieties* of potatoes are all obtained from ſeed. To ſee what was the extent of the varieties that might be thus obtained, I took the ſeeds from a ſingle potatoe-apple without any intermixture, and ſowed them: the diverſity was ſo great, that it could ſcarcely be called ſhort of infinite. The potatoes were diverſified prodigiouſly in regard to *colour*, being black, red, white, green, yellow, pink, &c.: to *ſhape*, long and round, knobbed and varied, in all proportions: to *ſize*, ſome of them being no larger the firſt year than peas, while others exceeded the ſize of the largeſt pullet's egg: to *earlineſs*, ſome of them having completed their growth, would be entirely ripe before the month of Auguſt, while others were only coming into bloſſom at the end of October: to *prolificacy*, ſome yielding above 200, while others gave only three or four: to *ſpreading* under-ground, ſome running out to a great diſtance, others growing quite cloſe to the ſtem; ſome going deep down, while others roſe to the ſurface: to *quality*, ſome being tough and watery, ſome dry and mealy; ſome very pleaſing to the taſte, others not eatable; and reſpecting ſtems, ſome carried a ſingle ſtalk like a rod, others an immenſe profuſion of ſtems; ſome very luxuriant, others extremely dwarfiſh. In ſhort, it would take a volume to deſcribe all the varieties; but what ſurpriſed myſelf moſt, was to find that there was no ſort of connexion between any two peculiarities. Two plants which reſembled each other exactly above ground, were often extremely diſſimilar below ground; while two bulbs, that reſembled each other in all reſpects, were ſometimes ſo different in quality, when tried for eating, that one was perhaps among the beſt, and the other among the worſt of the parcel.

I have been at the pains to ſtate all theſe particulars, to ſhow at the ſame time the benefits that may be derived by a cautious ſelection from ſeedlings, and the evil conſequences that may accompany a careleſs procedure in this reſpect. It was perfectly clear from this experiment, that no two ſtems produced from the ſame *ſeeds* were, *in all reſpects*, poſſeſſed of the very ſame qualities; but it likewiſe happened, that when the ſtems were taken up, many of the bulbs had ſuch a near reſemblance to each other, that when they were mixed together they could not be diſtinguiſhed by the eye, though it might perhaps happen that one of them was four times as prolific as the other, or was much better in other reſpects; but as the general practice is, among thoſe who rear potatoes from *ſeeds*, to mix all thoſe together which reſemble each other in appearance, a mixed breed is thus obtained, that is, upon the whole, leſs prolific and leſs pleaſing to the palate, than ſome of the beſt; ſo that the average crop is thus greatly diminiſhed in quantity, and rendered much inferior in quality to what it otherwiſe might have been: and as a practice in many places prevails of picking out the ſmalleſt potatoes for ſets; and as the original potatoe always produces a progeny having the ſame habits and qualities with itſelf, it will thus happen, that thoſe kinds which produce the largeſt bulbs will ſoon be entirely excluded from the ſets. The potatoes being ſeen thus ſenſibly to degenerate, this change is attributed to ſome unaccountable effect of *time* on the culture of this valuable eſculent; and thus, inſtead of preſerving one valuable kind, when it is once obtained, for a ſucceſſion of ages, it is quickly loſt; and a freſh ſucceſſion of fleeting varieties come in its ſtead, and are loſt in their turn, before their real diſtinguiſhing qualities can be accurately aſcertained, or they be univerſally diſſeminated through the whole nation.

Such is the real origin of that perpetual fluctuation and uncertainty in reſpect to the kinds of potatoes that is obſerved ſo univerſally to prevail in Britain; and it is a matter of much more ſerious moment that it ſhould be adverted to than moſt perſons are aware of. It is an undoubted fact, that with the ſame care and management, at leaſt *four* times the quantity of produce may be obtained by cultivating one variety of potatoes in preference to another. Nor does it any way follow, that the largeſt ſhall be the worſt of the two; for though this *may* be the caſe, it is merely accidental, and it may as readily be the reverſe. It does indeed happen, that the leaſt prolific ſorts, if the deficiency be very remarkable, are thrown away by the rearer; and thus are loſt. And it muſt happen, if no mode of ſelection for ſets be adopted, that theſe unprolific ſorts muſt gradually decreaſe from the general ſtock; but if they chance to be ſmall, and if the ſmall be reſerved for ſets, miſerable muſt be the degeneration that does in this caſe enſue.

On the whole, the practical concluſion from theſe facts is this: That no true breed of potatoes can ever be obtained *for a certainty* without admixture, but that which is the produce of a *ſingle ſtem*, whether that be of a ſeedling or other plant: That it behoves thoſe who wiſh to make a ſelection from *ſeedlings*, in the firſt place, to throw away all thoſe that do not afford an ample produce, and exhibit kindly habits in other reſpects: That when ſuch individuals as are deſireable in theſe reſpects are once obtained, and are planted the ſecond year, each carefully ſeparated from all others, theſe ſhould then have their eatable qualities particularly inveſtigated, and all thoſe ſhould be baniſhed, without mercy, which are not very good in this reſpect. By a ſelection of this kind continued, one good kind, when once obtained, could be kept without degenerating, as I have every reaſon to believe, for an indefinite number of years (*a*), or at leaſt till another ſhould be obtained; which, upon a fair compariſon, ſhould be found to deſerve a decided preference, when it would naturally give place to the better.

Nor is it from *ſeedlings* alone that one can make improvements in this reſpect: every man who has beſtowed attention to the culture of potatoes *at large*, muſt have obſerved that he meets with ſome ſtems in every field greatly more productive than others. And although this may ſometimes happen from a circumſtance no way depending on *kind*, as I ſhall ſoon have occaſion to ſhow; yet, in general, there is room to ſuſpect it may be owing to the parent breed. The very beſt of theſe individual ſtems, therefore, ought to be picked up with care and kept, the produce of each ſtem by itſelf, till their eating qualities be aſcertained; when that one which is beſt, in *both* reſpects, ought to be ſelected for a breed, and kept by itſelf carefully for that purpoſe. I can ſpeak from experience here with great certainty; and can affirm, that by a careful attention to theſe circumſtances, a farmer in a very few years will, in many caſes, more than double the amount of his average crop of potatoes, ſoil and culture being the ſame. It is eaſy to obſerve, that where the original breed of potatoes has been unmixed, the extent of this kind of improvement muſt be far leſs conſiderable than where a mixture has taken place.

While this circumſtance is not adverted to, it muſt occaſion prodigious diverſities in regard to the reſults reſpecting the produce of this plant: Two men, who are equally ſkilful, and equally careful in their culture in all reſpects, ſhall have returns extremely diſſimilar: the produce of the one may be double to that of the other. And as the idea of enchantment is now baniſhed from this country, the careful farmer who compares his produce with that of another, and finds the difference by account ſo much againſt himſelf, is ſure to attribute this difference in part, if not entirely, to exaggeration alone, or to ſome unaccountable defect in the *ſeaſon*; to which he often aſcribes an unuſual failure in his own crop, which originates in the cauſe above ſtated.

(*a*) I have never met with a ſingle fact, well authenticated, that tended to ſhow that any kind of potatoe really degenerated, by a continued cultivation for a length of time, farther than what can eaſily be referred to the cauſe above explained. When potatoes were firſt introduced into this country, there were two kinds only known; a round red potatoe, and an oblong white kind, that went very deep into the ground. Theſe continued the only kinds known for many years, and gave no marks of their growing worſe. Other kinds at laſt came into uſe, that were thought more prolific than them, and were preferred on that account. But now the freſh kinds are obtained from reds, all of which I have reaſon to believe are mixed from the beginning; they degenerate apace, and they diſappear almoſt before they are known.

In regard to the *culture* of potatoes, as I ſhall have occaſion to reſume that ſubject afterwards, I only take notice at preſent, that this muſt, in many caſes, be influenced by the nature of the potatoe to be cultivated. Some kinds ſend their bulbs downward, and penetrate to a great depth; while others puſh them upwards, ſo as to be in danger of coming above ground. The culture that would beſt ſuit the one, would be very improper for the other; ſo that two men, each deſcribing the culture that he has found to be preferable to all others, may give directions almoſt entirely the reverſe of each other. Some potatoes again puſh out their fibres very far, and produce bulbs only at a great diſtance from the ſtem; while other kinds produce the whole in a cloſe cluſter at the bottom of the ſtem only. Nothing can anſwer better for the culture of theſe *laſt* mentioned varieties than the horſe-hoeing huſbandry; though nothing can be worſe for the *firſt*. I had once a field of potatoes of this rambling ſort, the qualities of which I did not know at the time of planting; theſe were horſe-hoed as uſual very cloſe to the ſtem, and as late as the ſtate of the ſtem would admit; the conſequence was, that moſt of the umbilical fibres were cut, ſo that they had to form tubercles anew; and being a late kind, it was found at the uſual time of taking potatoes out of the ground, in October, that many of the bulbs were no better than peaſe, and few of them above the ſize of a nutmeg; ſo that the crop was entirely loſt. Few people now chooſe to cultivate potatoes that have this peculiarity, as they are inconvenient in many reſpects: nor are thoſe kinds that ſend their bulbs deep in the ground ſo durable, for many reaſons, as thoſe that riſe upwards.

Not only may the amount of the crop be varied by the qualities of the *kind*, as above ſpecified, but it may be alſo prodigiouſly varied by the *ſize* of the ſets planted by way of ſeeds. This fact I aſcertained by a ſet of experiments, conducted with great accuracy, which are recorded in the Bath Society's Tranſactions; the reſult of the experiment was, that by varying the ſize of the ſets, from two ounces downwards to the ſmalleſt cuttings I planted, the produce from the ſame number of ſets of the largeſt was *ten* times the amount in weight of that from the ſmalleſt ſets. Let no one however, from this fact, though duly authenticated, conclude that he might obtain a crop of ten times as much from a whole field planted with large ſets, as he could obtain from it if planted judiciouſly with ſmall; for as the plants that ſpring from the ſmall ſets are always weaker and more dwarfiſh than the others, they can be planted much cloſer upon each other than the others, without dwarfing them very much; there may therefore be ſafely grown a much greater number of ſtems on the ſame extent of ground where ſmall ſets are employed than where large ones are prefered, ſo that although the produce of each of the large ſtems were equal to *ten* of the ſmall, yet if there could be *five* (let us ſuppoſe) ſmall ſtems reared for *one* of the large, in that caſe the real difference of produce would only be as *two* to one: if two ſtems grew inſtead of one, the difference would be as *five* to one; though the difference in point of value would, even in this caſe, be much more; for not only is it more difficult and expenſive to cultivate a field properly where the ſtems muſt be placed very cloſe together, than where they ſtand more apart; but in all caſes the bulbs produced from the ſmall ſtems are much ſmaller than thoſe that are afforded by the more luxuriant plants; and it is well known, that the ſame weight of *ſmall* potatoes will ſeldom bring above half the price of thoſe that are *large*. I take notice of this circumſtance, to obviate erroneous concluſions that might be drawn from this experiment; and the ſtill more erroneous concluſions that might be drawn from experiments that may be made in conſequence of it, with the common *inaccuracy* that takes place in regard to matters of this kind. There can be no doubt, that under a proper management, the ſame ground, with the ſame manures and culture in other reſpects, will afford a crop of at leaſt *double* the amount, if ſets not under two ounces be employed, in place of the *ſmalleſt* cuttings that ſome *thrifty* managers are ſo careful to employ (c). This is alſo an unobſerved circumſtance that frequently influences the amount of the crop very much, and which all goes to the account of the *ſeaſon* wherever it is obſerved. No wonder if men, who are neither in the habit of adverting to the one or the other of theſe circumſtances, which where they chance both to concur to heighten or diminiſh a crop, may make a variation of at leaſt *four* times its total amount, ſhould differ extremely from each other in their idea of the poſſible product and conſequent advantage that may be derived from the culture of this moſt valuable eſculent.

One practical deduction may be made from the whole of this part of our inveſtigation, that never ought to be loſt ſight of: it is, That no *abſolute* reliance can be had on any experiments that ſhall be made on the culture of potatoes, unleſs where the perſon who makes the experiments begins, as one may ſay, *uſque ab ovo*; that is, by raiſing the plants he is to employ as ſets, from the produce of one ſingle ſtem, and multiplying them till he can obtain as many ſets as anſwers the purpoſe he has in view. If this be not done, eſpecially where the produce of a few individual plants are to be compared with each other, it may chance that an unprolific ſort comes by

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(c) We have ſeen an œconomy of this ſort recommended in all the newſpapers as a great improvement; which, I doubt not, has very much diminiſhed the crops of ſuch incautious individuals as truſted to it. It was recommended to cut off thin ſlices from the ſurface of the potatoe, with an eye in each, to be employed as ſets, and the nucleus in the heart to be kept for food. It is ſcarcely poſſible to deviſe a direction that would with greater certainty inſure a deficient crop, unleſs it be another practice that has been recommended, from the ſame quarter, with equal ſtrenuouſneſs, that of planting ſprouts without any bulbs at all.

accident to be compared with one that is naturally more prolific; ſo that the reſult may be the reverſe of what it actually would have been, had the *kinds* been the ſame. Wherever this precaution has been omitted, the moſt accurate ſet of experiments can only be conſidered as leading to *probable* concluſions, which will be more or leſs uncertain in proportion to the ſmaller or greater number of plants that are taken as one aggregate *(d)*. At the time I made the ſet of experiments recorded in the Bath Tranſactions, the fact on which this concluſion is grounded was not known to me, ſo that the precaution it ſuggeſts was not attended to; but as it was made in Aberdeenſhire, where new varieties of potatoes were at that time very little known, I have reaſon to believe that the breed employed was very unmixed; and as the ſame experiment has been often repeated in kind, though not in degree, and without the ſcrupulous accuracy of an experiment, with the ſame general reſult, I have every reaſon to be ſatisfied with the juſtneſs of the concluſions there made.

QUERE II. "What is the beſt manure for potatoes?"

I have not had an opportunity of trying ſuch a diverſity of manures as to enable me to give a direct anſwer to this quere. I ſhall therefore content myſelf with a few obſervations on this head, that are the reſult of the experience I have had.

It appears to me, that manure may tend to augment the produce of potatoes in two ways; and accordingly as the one or the other is intended, the nature of the manure may be varied. The *firſt* is, where it tends to promote the general fertility of the ſoil, and conſequently to add to the health and luxuriance of the *plant*. With this view, all enriching manures that operate upon the ſoil more by their chemical than their mechanical qualities, are evidently beneficial; but their relative degree of excellence, as applied to this particular plant, I have had no opportunity to aſcertain.

The intention of the ſecond claſs of manures, as applied to the potatoe, is to render the ſoil in which the *bulbs are to be formed*, as light and open as poſſible; which is found, by univerſal experience, greatly to augment the ſize of the bulb. In this caſe more reliance is had upon the *mechanical* operation of the ſubſtances employed as a dreſſing, than on their *chemical* qualities. In this point of view, I have known many ſubſtances employed with good ſucceſs by poor people, to augment the produce of their potatoes, that could ſcarcely be deemed, in the uſual ſenſe of the word, manures at all: ſuch as twigs of young trees, cuttings (clippings) of hedges, ſmall buſhes of broom and furze, runts of cabbages laid in the trench where the potatoes were planted, and then lightly covered up with earth. Theſe ſubſtances, ſo little periſhable in their own nature, remain very little altered during the time that the potatoes are growing; but by rendering the earth above the bulbs light and porous (for the looſe earth inſinuates itſelf among their ſmall twigs) it forms a bed extremely favourable for the ſwelling of the bulb, which delights in a dry, light, crumbly mould; whereas the *root* of the plant, properly ſo called, delights to ſtrike into a firm rich loam, tending to clay, in which it thrives with amazing luxuriance.

(d) I ſpeak here only of thoſe experiments that are conducted on a plan of diſtinct accuracy, as to weight, meaſure, and other circumſtances. As to the vague trials that are often made under the dignified title of *Experiments*, they deſerve to be reprobated as a political nuiſance, that can have no other tendency than to keep error in faſhion.

From theſe facts I am ſatisfied, that in order to obtain a full crop of potatoes, the ſkilful cultivator muſt adopt a practice that ſhall be fitted to anſwer both of theſe intentions. Every one knows that the potatoes do not adhere to the *roots* of the plant, but to a particular ſet of fibres which puſh out from the bottom of the ſtem, which nature has provided for this very purpoſe, and which may be very properly diſcriminated by the name of *Umbilical* Fibres. The fibres generally puſh out in a horizontal direction, often riſing a little upward (*e*), while the *roots* of the plant, through which it ſucks in the nouriſhment that ſuſtains it, ſtrike down into the ſoil below theſe fibres, where they branch out into various ramifications in ſearch of food, as is common with moſt plants. The ſoil therefore that is fitted to ſuſtain, and to afford nouriſhment to the plant, and the bed in which the bulbs are to be depoſited, are two things totally diſtinct from each other, that are connected merely by juxta poſition; each requiring to be poſſeſſed of qualities different, and even oppoſite in ſome meaſure, to what would be required in the other: For the *potatoe-bed*; light, ſpungy, open friability are the qualities that ſeem to be the moſt indiſpenſably neceſſary; a power to abſorb and retain moiſture in a moderate degree, without loſing its adheſiveneſs and ponderoſity, which are the principal characteriſtics of what we call a *rich* ſoil, are by no means requiſite for the upper bed; but it is theſe qualities that conſtitute the very eſſence of the bed in which the *abſorbent roots* are to ſpread, and from which they are to draw the nouriſhment for the plant. The chief dexterity in cultivating the potatoe

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(*e*) It is potatoes having this quality that are now in general preferred for propagating; and it will be obſerved, that the culture, recommended above, is ſuppoſed to be adapted for this kind of potatoes only.

conſiſts in combining theſe two qualities together. Nor have I often ſeen it attempted in the way that is the moſt likely to effect theſe purpoſes in the moſt direct and ſpeedieſt manner.

There can be no doubt but a firm rich loam, tending to clay, is that which is the beſt adapted for rearing the potatoe-*plant* to its full perfection in this country; and, under proper management, to reſiſt the viciſſitudes of the weather, ſo as to inſure its health the moſt effectually againſt accidents. But a lighter ſoil, under the uſual management, is found to afford, in moſt ſeaſons, a greater produce in *potatoes*, eſpecially if the ſummer chances to be a little more than uſually moiſt. When it is very dry, the caſe indeed is reverſed. The ſole defect of the heavy loam is the want of levity on its ſurface; and it is this ſuperficial levity in the light loam that counterbalances its other radical defects. Enriching manures, ſuch as well rotted dung (lime in moſt caſes) decayed animal ſubſtances of any ſort, &c. (*f*) will all tend to render both theſe kinds of ſoils more capable of encouraging the growth of the potatoe-*plant*; which is the firſt requiſite for an abundant crop of bulbs: but to diſpoſe it to *bear* kindly, lightneſs of ſurface muſt alſo be given. In this point of view, the propriety of employing *both* the kinds of manures, eſpecially for the weighty ſoil, becomes apparent. The ſoil ſhould, in the firſt place, be rendered *rich* to a ſufficient depth, by means of enriching manures worked into it by repeated good ploughings. In this the roots would be able to ſtrike with eaſe, and ſend abundant nouriſhment: but a ſurface-dreſſing ſhould be given of the mechanical claſs of manures, which would give to the ſurface the ſpungy lightneſs that is ſo much wanted (*g*). The beſt and readieſt manure to be found of this kind that I know, is very rank new made ſtable dung, that conſiſts chiefly of litter: and if it participates a little of the enriching quality from the dung, that will do no harm; for by being waſhed down to the roots in ſummer, it will gradually promote the growth.

To obtain the *very fulleſt* crop of potatoes, upon this principle, from a firm loam, I ſhould adviſe the enriching manure to be applied the preceding year to a crop of turnips, properly prepared and horſe-hoed. In this caſe there is no danger of giving too much dung. Thirty good cart-loads of dung is as little as ſhould ever be uſed: better if ſixty can be ſpared. This

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(*f*) I wiſh to avoid all diſputes about nice metaphyſical diſtinctions reſpecting manures, which many people are very fond of. Without concerning myſelf with theſe, I muſt here be underſtood to mean that a manure tends to *enrich* the ſoil when it tends to render that ſoil more prolific, and affords greater crops than it would otherwiſe have done, without inquiring into the *modus operandi*.

(*g*) It is very obvious, that were the *old* kidney white, which ſometimes ſent its bulbs to the depth of near two feet in a rich mellow ſoil, to be now cultivated, the rendering the ſurface lighter could be of very little ſervice to it.

ground to be ploughed to a good depth twice, before planting the potatoes in the ſpring. After the laſt ploughing, let it be moderately harrowed and laid out into breadths of three feet each, by drawing a furrow along every line, ſo as to mark the rows of potatoes. This furrow ſhould not exceed two inches, or at the moſt three in depth at any place, and ſhould be made with a plough that had a very flat ſole, ſo as to make a wide ſhallow trench. In the middle of that trench the ſets ſhould be depoſited, and above theſe ſhould be laid the very rank dung; which, if it can be had in quantity ſufficient, ſhould be laid about from three to ſix inches thick above the ſets. A plough with a double mold board ſhould then be paſſed along the intervals, between the rows, ſo as to make a trench in the middle, and turn the earth lightly over the dung at each ſide: no matter though it does not cover it entirely. The ground in this ſtate, being quite free from danger of being hurt by wet, may be left for a few weeks; but if maſterly culture be intended, it ought to get a complete horſe-hoeing, not in the uſual way of turning the earth alternately to and from the middle of *the interval*, but to make it be turned alternately from *one row* to the other, and the next time reverſed, ſo as to be laid back to the row from whence it was taken. In this way, and in this alone, can the earth be *properly* looſened in horſe-hoeing. Theſe operations ſhould be repeated once a fortnight, if the weather will permit, as long as the ſtems of the potatoes will admit the plough to be introduced. The earth ſhould be raiſed as high up to the ſtems as poſſible at the laſt hoeing; and better if it is at this time only that the dreſſing is completely covered, and the furrow be left very deep and clear in the middle between the two rows. In this way the *roots* have a deep bed of mellow friable earth to range in on both ſides, which is in no danger of being drenched with too much moiſture (the moſt deſtructive enemy of the potatoe) and the bulbs have full room to ſwell in a light ſpungy bed at top; which is all that is neceſſary to give them their full perfection.

It is almoſt unneceſſary to obſerve, that as ſoon as the potatoes ſhow their ſtems above ground, they ought to be carefully hand-hoed: an operation which, under this mode of management, is extremely eaſy; and that no weeds whatever ſhould be ſuffered at any time to remain among the plants. Neither do I think it incumbent upon me here to enter into the minutiæ of the mode in which the different operations recommended may be beſt performed, as ſuch directions appear to be here ſuperfluous; but if the Board ſhall think otherwiſe, they ſhall be communicated when required. I have found it neceſſary to do this pretty fully towards the end. Neither do I think it neceſſary here to enter into a detail of the rotation of crops that would beſt ſuit the potatoe ſyſtem in different circumſtances; which, though a very important conſideration, would be here miſplaced. I ſhall only juſt obſerve, that where a *very maſterly* culture is intended, potatoes do beſt to ſucceed graſs-land, if very rich; turnips where it is moderately ſo, or carrots where in fine order; and ſhould be ſucceeded by wheat where the land is not too rich for it. Where wheat dares not be ventured becauſe of over-luxuriance, it may be either laid into graſs immediately after lifting the crop of *early* potatoes without a crop, or planted with greens, to be ſucceeded by carrots in the ſpring: theſe to be followed by early potatoes and graſs. But this is all upon the ſuppoſition that the culture is to be of the very beſt kind on a rich ſoil.

QUERE III. "What is the average produce per acre?"

I ſhould not have ventured to ſtate to the Board the produce of potatoes that may be obtained from an acre, unleſs I had previouſly explained the circumſtances above mentioned; becauſe I am ſenſible the facts I ſhall now ſtate, would be by many worthy cultivators deemed impoſſible. I have no heſitation, however, in ſaying that I have actually reaped of good marketable potatoes at the rate of more than thirty tons weight (*h*) from a Scotch acre of ground (the Scotch is to the Engliſh acre as 5 to 4 nearly): and I am very far from thinking that this is the utmoſt maximum produce that can be obtained. I chooſe to ſtate the weights of produce in tuns, becauſe every one who chooſes it can eaſily reduce it to the meaſures beſt known to himſelf. I conceive, that moſt perſons will find that this is conſiderably above the average produce obtained, though ſome individuals will come much nearer it than others. In the preſent ſtate of our knowledge reſpecting the *kinds* of potatoes and other circumſtances, I ſhould conceive that *thirty* tons from an Engliſh acre might be conſidered as about a maximum crop. But ſhould the attention of men be directed ſteadily to the raiſing new varieties, and always ſelecting the beſt, from what I have already ſeen on this branch of the ſubject, I ſhould not be ſurprized if, in the courſe of ſome years, the above-named produce, however high it may at preſent ſeem to be, would come to be conſidered as nearer a *minimum* than a *maximum* produce.

With regard to the price of potatoes, as that muſt vary in every diſtrict according to circumſtances, it is beſt for every one to enquire what it is in the place where his intereſt lies (*i*); the quantity being known, the price there can always be eaſily aſcertained.

To the 4th Quere I can ſay nothing from experience, having never ſeen

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(*h*) I have indeed, in ſome experiments, had at the rate of more than forty tons.

(*i*) In this part of the country, the price on an average is about forty ſhillings per ton.

potatoes tried for many years ſucceſſively upon the ſame ground; but I have ſeen no fact that ſeems to indicate that the ground is ever deteriorated by this crop. But the whole doctrine of the exhauſtion of ground by particular crops, would require ſuch explanations before it could be rendered properly intelligible, as it would be very improper to enter upon in this place. Perhaps the beſt places to learn whether ground, when repeatedly cropped with potatoes, becomes gradually leſs fitted to produce that crop than before, may be the neighbourhood of Mancheſter and Liverpool, or in the Weſt Highlands of Scotland, among the rocks, where the little ground they can cultivate is chiefly employed for rearing this plant.

With regard to the uſe of the ſtems of potatoes for feeding beaſts, and the effect of cutting them, in as far as reſpects the plant, little need be ſaid. If the tops be cut while they are yet in a green and ſucculent ſtate, they are readily eaten both by cattle and horſes, and prove a very wholeſome food to them: but theſe can never be cut over with ſafety, till the very moment the potatoes are to be taken out of the ground; for my experiments prove, in the moſt deciſive manner, that the farther growth of the potatoe (the bulb) is entirely ſtopped the moment that the ſtem is cut over: and as the bulbs are in a ſtate of rapid advance when the ſtalks continue ſtill in full verdure, no practice could prove more unœconomical than that of cutting off the ſtems at this period of their growth, and allowing the bulbs to remain ſtill in the ground.

With regard to the *quantity* of forage that may be thus obtained, it will vary amazingly, according to the *kind* of potatoe cultivated; for the diverſity in this reſpect is very great. Some kinds carry an upright firm treelike ſtem, that never bends downward, and affords very few leaves, and theſe dry and ſticky; while others ſend forth an immenſe multiplicity of ſoft trailing ſtalks, furniſhing large lateral ramifications, garniſhed with a vaſt profuſion of very ſucculent leaves. Some riſe to a prodigious height, having large hollow ſtems and waving branches, while others are extremely weak and puny, ſcarcely ever riſing beyond one foot in height, and tending very quickly to decay. Nor are theſe peculiarities any indication of the ſtate of the bulbs, which are ſometimes very large and abundant at a puny ſtem, and *vice verſa*; ſo that the benefit that can be derived from the tops of potatoes will be extremely different in different circumſtances, and muſt always be confined to thoſe alone that are taken up for early ſale. Where the ſtalks are large and abundant, they ought always to be collected together when dry, after the crop is taken up, as theſe will afford a great abundance of excellent litter; which, being very ſtrong, would make a very good ſurface-dreſſing for a freſh crop of potatoes. But an attention to the œconomical management of forage for the purpoſe of augmenting dung, ſeems to be ſo little the taſte of the preſent day, that this and many other articles of the ſame kind will, I fear, be diſregarded.

I may juſt take notice before leaving this branch of the ſubject, that my experiments have clearly proved the inutility of covering the ſtems of the beſt kinds of potatoes cultivated among us. An opinion is very generally entertained, that when the ſtems are laid down in the earth, they ſend out bulbs from theſe ſtems in great abundance. I can ſay from experiments very carefully conducted, that I have not found this to be the caſe in the ſmalleſt degree; but that laying down the ſtems and covering them with earth, *diminiſhed* the produce. I would not, however, pretend to aſſert that this will be found to be *univerſally* the caſe; for I have remarked, that in wet ſeaſons ſome kinds of potatoes have a tendency to ſend out ſmall bulbs from the ſtem, which continue there of a blackiſh green colour. Theſe, if laid under the earth, would no doubt become the ſame colour with the bulbs; but I doubt much if they would ever come to a great ſize: but not having tried theſe, I cannot ſpeak with certainty.

From the foregoing ſtatement of facts, which are the reſult of a pretty extenſive experience in the cultivation of this plant for many years paſt, aided by not a few experiments conducted with a painful degree of accuracy, it will, I hope, appear evident, that one of the circumſtances which has tended the moſt to retard the general culture of this plant, is the difficulty of obtaining, with *certainty*, the beſt varieties. In the excurſions I have made through the country, I have found the effects of this want ſeverely experienced. In ſome places, they cultivate ſorts that never can be made to produce one half of an average crop: in other places, the kinds they have are of ſuch a bad quality, as nothing but a want of other food could induce one to eat them. The badneſs of the quality makes the demand much leſs conſiderable than it otherwiſe would be; and no fact is more certain, than that the *quantity* grown by the farmer will always be in proportion to the demand. The average ſelling price of potatoes throughout the whole kingdom, which is liable to leſs variation than any other kind of human food, is an abundant proof that the *quantity* reared has always kept place with the *demand*. The want of market then is the only circumſtance that ſets bounds to the culture of this eſculent: and if its culture is meant to be extended, meaſures muſt be adopted to extend the *demand*; without doing which, the whole national treaſure may be expended in vain to force an extra production of them. It may breed up a ſwarm of reptiles, but never will promote the exertions of honeſt induſtry.

That an abundant market for potatoes always produces an extenſive cultivation of that plant, is obvious from an attention to the circumſtances in which ſuch extenſive plantations are found. In the neighbourhood of every large town you find extenſive fields of potatoes univerſally; but in diſtant parts of the country, no ſuch thing is anywhere to be ſeen, except in ſome parts of Lancaſhire and Cheſhire, near to the canals; from whence, beſides ſupplying Mancheſter and Liverpool, they are ſhipped off in large quantities for Ireland. In country places, every family raiſes a few to ſerve itſelf. A farmer does that for his own family: but were he to try to ſell them in quantities to make up his rent, where are purchaſers to be found? In his own neighbourhood there are none; the towns at a diſtance are all abundantly ſupplied; and the expence of the carriage to that market would in many caſes amount to half the price. The riſks attending the cultivation of this crop, the vaſt quantity of barn-room that is required to preſerve them from froſt in winter, and the ſtill greater extent of it that is required to prevent them from *growing* after the ſpring comes in, renders the keeping them in great quantities a very expenſive and even an impracticable thing. Nothing can more clearly prove the univerſal diſpoſition to cultivate this plant, than the wonderful exertions that have been made in all diſtant parts of the country to overcome this difficulty. The practice of *hutting* them in the fields has been there adopted almoſt univerſally: a practice that ſcarcely any thing elſe than *neceſſity* can be pleaded in its favour. Where a *few* are to be preſerved for the uſe of a private family, it may be borne with, becauſe in that caſe one is not under the neceſſity of counting the coſt, and the expence eſcapes obſervation; but where they are to be conſidered as a marketable article, where a merchant who buys and ſells muſt enter every article of expence incurred in his books, it is ſoon found that the *expence* and *riſk* of this practice can in no caſe be borne, and it muſt be abandoned.

The difference between the barn-room required for ground cropped with potatoes or with corn, is inconceiveably great. A barn that would not be capable of containing more than the produce of one acre of potatoes (a maximum crop) would be large enough to threſh and dreſs the produce of five acres of corn at leaſt every day: this is thirty-five acres per week. And as the barn with the potatoes will, on an average, be occupied by them at leaſt nine months in the year, it appears that *one* acre of potatoes will require as much barn-room as *might* ſerve to dreſs all the corn produced on upwards of 1200 acres of ground cropped with corn! While the miſerable ſyſtem of gentlemen refuſing to grant leaſes ſo generally prevails, and the wretched expedient of throwing repairs upon the landlord (which is a neceſſary conſequence of it) exiſts, what hope is there that ever this inſuperable bar to the very extenſive culture of potatoes upon a large ſcale can ever be eſtabliſhed? The very difficulty of keeping them, deteriorates their quality, and thus diminiſhes the demand. After the ſpring commences, potatoes cannot be prevented from ſpringing, unleſs they be ſpread out thinly on a floor, and often turned. Nay, even in winter, when they are put together in great quantities, they will ſend out long ſhoots; and at that time they muſt not be opened for fear of froſts. The ſtems that have thus ſprung out are carefully rubbed off, and they are blended with others in the market; unſkilful perſons purchaſe them; and finding the potatoes very bad, conſume the fewer of them. The difficulty of keeping them, and the neceſſity of their being readied by fire before they can become a very nouriſhing food for beaſts, will always operate to prevent them from being extenſively uſed in that way; and the revenue laws prevent them from being employed in the diſtillery: the only way in which they could be made extenſively uſeful as a food for beaſts. In ſhort, there is no extenſive market; and in the preſent ſtate of things, there can be none found for this article, unleſs it be in the neighbourhood of ſome large towns, or particularly circumſtanced ſea-ports, where only they can be extenſively reared.

Theſe circumſtances may very naturally eſcape the notice of the gentlemen who compoſe the Board of Agriculture, but they never can ceaſe to be deeply felt by the farmer who ſhould incautiouſly enter deeply into that line; and his future conduct muſt be influenced by it.

From the produce that I have ſhown may be obtained from an acre of land in potatoes, under good management, there is no doubt but many farmers, in diſtant parts of the country, would gladly enter into the ſpirited culture of that plant, could they find a market for it; but in theſe ſituations *one* great object of the farmer's attention muſt be to find a crop that can be carried to market *at a ſmall expence*. Potatoes are a crop directly the reverſe of this to an aſtoniſhing degree; nor is the expence of cultivating it ſo eaſy, or the accidents to which it is liable ſo few, as not to oblige a man to act with ſome degree of caution, eſpecially where tithe is to be exacted; which in this, as in all other caſes, muſt operate as a powerful bar to ſpirited cultivation of any ſort. To obtain a *maximum* crop of potatoes, I do not overrate the expences that muſt be incurred, including ſeed, culture, manures, and rent, at twenty pounds per acre. If the crop be good he may be indemnified, and perhaps a little more. The tithe would have been a good profit to help to indemnify him, in caſe of a ſucceeding one failing; but it goes into the pocket of another, who incurs no part of the expence. If the crop fails (which happened almoſt totally and univerſally in the year 1782 in Scotland) not only the profit is loſt, but the whole outlaid money is gone for ever. Under circumſtances of that kind, a ſpirited and extenſive cultivation can never become general. Wealthy farmers, who alone can bear the charge of a ſpirited agriculture, will keep aloof from it, on account of the difficulty of ſales *(k)*; and it muſt be abandoned to thoſe of an inferior

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(k) No perſon who has not tried it, can form an adequate idea of theſe difficulties. Even in the neighbourhood of this place (Edinburgh) where the conſumption of this article is conſiderable, it will in general be the work of one horſe and two perſons *three* days to ſell a ton of potatoes, by hawking them through the ſtreets. If they are ſold by little people who keep a ſtand, they muſt be kept by the farmer till they are wanted, and ſent to town in ſmall quantities of one third or half a ton at a time: and even in that way, they muſt be ſold at a vaſt diſcount, and no inconſiderable riſk.

ſtamp, who have neither the ſkill nor the enterprize to puſh the cultivation of this plant, in all its branches, to the perfection of which it is ſuſceptible.

The circumſtance that is moſt wanted (I have already ſaid) to lay the baſis of this good culture, and to render the uſe of this valuable eſculent more univerſal among all ranks of people, is to deviſe a mean by which cultivators in every part of the country may be certain of being able to get the very beſt kinds known, both in reſpect to palatableneſs and productiveneſs. Nor do I know any way in which this could *poſſibly* be effected, unleſs it can be done under the auſpices of the Board of Agriculture. The object to be attained is obviouſly of very great national advantage; but whether it will appear to be of as great importance by the Honourable Members of that Board as it does to me, I am much inclined to doubt *(l)*. If it did, I think it could be with certainty effected. It is my duty to ſuggeſt what appears to be beſt for the public weal: it is the province of the Board to judge whether theſe ſuggeſtions deſerve to be attended to or not. To that Board, I beg leave to ſubmit, with all due deference, the following obſervations:

The firſt great point wanted, is to obtain a kind of potatoe which, when compared with others of the beſt kinds, ſhall be deemed the moſt palatable; for I hold it to be an undeniable fact, that it is the unpalatableneſs of many of the kinds of potatoes now cultivated, that renders the conſumption of them much ſmaller (perhaps not at preſent one fourth part) of what it would have been.

The next particular to be adverted to is, that it ſhould be alſo the moſt productive.

And the *laſt* circumſtance I ſhould at preſent enquire for would be, that it ought alſo to be the earlieſt.

To find all theſe qualities, in the higheſt degree, united in one and the ſame potatoe, will probably be a matter of great difficulty; but it is certainly not impoſſible: and where a number of people are induced to bend their attention with great ſteadineſs towards one point, it is inconceiveable how accurate they will become in the diſcrimination of facts, that otherwiſe might have totally eſcaped their notice. And where an immenſe number of facts, all tending towards one point are brought together, ſo as to admit of their being accurately compared with one another, more may be done in one year than could have been done otherwiſe in a hundred years.

Upon this principle I ſhould humbly propoſe, that the Honourable Board of Agriculture ſhould hold out a *very high* premium to the perſon who ſhould

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(l) I conſider this as a premium given to the eaters, to make them conſume more; nor do I know any other kind of premium that will produce this effect.

produce to the Board before ſuch a day one thouſand ſets of potatoes (m) that had been all the produce of one original plant, each ſet weighing two ounces at leaſt; which ſhould poſſeſs, in the higheſt degree, the three qualities above named; that is to ſay, which ſhould be known, by experiment made for that purpoſe, to be capable of producing, on a good ſoil, with good culture, at the rate of *thirty* tons weight of good marketable potatoes per acre; and which, in a good ſeaſon ſhall attain to their full maturity on the firſt day of Auguſt.

Before the potatoes can be admitted to a competition, let atteſtations be brought, duly authenticating the fact that the quantity required had actually been produced, and alſo that they had completely attained their full ſize before the firſt of Auguſt; and likewiſe that the whole number of plants had been propagated without admixture from one original ſtem: and that the potatoes had been tried, and found very pleaſant to eat by a good number of perſons. Under theſe preliminary precautions they ought to be admitted to a fair competition for the premium.

I have ſaid before, that the premium ought to be *high*. How high the Board will chooſe to go, depends upon the Board alone to determine. My own opinion decidedly is, that if great effects are to be expected, it cannot be too high. When this is the caſe, the premiums are few, and cautions can eaſily be adopted to guard againſt frauds, where the diſtribution depends upon a number of men reſpectable for rank and fortune; nor is it poſſible to conceive the eagerneſs that the hopes of obtaining a very high premium will excite among an infinite number of individuals, who are capable of making accurate diſtinctions, or the exertions it will produce: whereas a number of *ſmall* premiums ſeldom produce any other kind of exertions than thoſe that are calculated to deceive. It ſerves as a whetſtone to cunning: and colluſions and multiplied frauds are the only fruits that are produced by them in abundance. It is from theſe conſiderations that I have always compared numerous ſmall premiums, whether they are given by government, or by individuals of high rank, as being exactly ſimilar in regard to their operation upon wealth, to that of ruſt upon metals (which imperceptibly conſume it) while they at the ſame time ſerve to contaminate the place where that operation has been carried forward. I have not a doubt, if a thouſand pounds were diſtributed in a thouſand premiums of twenty ſhillings each, or the ſame thouſand pounds to be offered in *one* premium only, but that the ſum total of the exertions that would be made throughout the nation at large to obtain the high premium, would be at leaſt a thouſand times greater than thoſe that would be made to obtain the ſmaller ſums, though ten thouſand times the number of frauds would be practiſed to gain theſe ſmall premiums.

(m) Fewer than this number I ſhould reckon unfit for making the fair comparative trial, afterwards recommended.

One great uſe of the mode of diſtributing premiums I propoſe would be, that it would give a fair opportunity of aſcertaining, by actual experiment, the real comparative value of the different *good* kinds of potatoes, and of diſtributing *the beſt* ſorts throughout the whole kingdom; ſo that every perſon who became poſſeſſed of it, would be certain that he thus obtained a known ſtandard, by which he himſelf would have it in his power to aſcertain the comparative excellence of any other variety that might fall in his way.

That nothing may be wanting on my part to forward this very uſeful undertaking, I ſhall beg leave to ſubjoin full directions for the manner in which the potatoes ought to be cultivated, ſo as fairly to aſcertain the comparative value of the different kinds admitted to the competition, and to diſtribute the beſt kinds, after they had been thus aſcertained, ſo as to anſwer the purpoſes intended.

Mode of Culture, with a View to aſcertain the Maximum Produce and other Qualities of different Kinds of Potatoes, on a fair comparative Trial.

A ſpot of clean rich land, as uniform in its quality as poſſible, ſhould be made choice of for the experiment, at ſome diſtance from London. If poſſible, the place ſhould be concealed from the knowledge of the public, with a view to prevent impertinent viſitors. At any rate, it ſhould be well fenced in, the gate locked, no ſtranger allowed to enter into it during the courſe of the experiment without a written order from particular perſons; and to inſure againſt accidental treſpaſſes, a guard ſhould be made to watch every night from the time the potatoes appear above ground till they be taken up. Somewhere in the *Hundreds* of Eſſex, at no great diſtance from the river, appears to me to be, upon the whole, the beſt place to look for ſuch a field.

If the ground is in graſs, which, if rich enough, I would by all means adviſe ſhould be the caſe, it ſhould be broke up in the month of Auguſt, by as ſhallow a furrow as the ſtate of the ground would admit of at the time; the ſward being turned on its back as flat as may be, with a view to its rotting quickly. In the month of October it ſhould get a very *deep* clear furrow, laying it then into ridges with clear water-furrows, that ſhould be ſo deep, if the ſub-ſoil be retentive, as to carry off all the water, not from the ſurface only, but from the very *bottom* of the ſoil that has been ſtirred by the plough. It is of much conſequence that the ſoil ſhould be looſened at this time to a good depth; for it is thus alone that the *ſurface* mould can be kept ſo dry during a continuance of rainy weather as never to become a pap; which it infallibly will be, if the rain be forced to ſeek a paſſage to the furrows along the firm mould immediately below a very few inches only of mellow ſoil that has been touched by the plough. An inattention to this circumſtance loſes many a crop of potatoes, and other crops, upon *retentive* ſoils. I need hardly add, that the ploughing ſhould be given while the ground is in a proper ſtate of dryneſs. Wet ploughing is always prejudicial to a potatoe-crop, and therefore ought to be guarded againſt.

In this ſtate the land ought to lie all winter. In the month of March, as ſoon as the ground is ſo dry as to admit of working kindly (and it ought on no account to be touched but when it is in this ſtate, if it ſhould be allowed to remain even till the end of April, which can ſcarcely ever happen in our climate) it ought to be ploughed acroſs. This operation ſhould, if it can be got done, be performed by means of a turn-wreſt plough *(n)*, in order to avoid the croſs furrows that will be left if done by a common plough, which would be in ſome danger of marring the accuracy of the experiment. And now is the time for the experimenter to exert himſelf with the moſt unceaſing alacrity; for ſhould he allow himſelf to be ſurprized by a heavy fall of rain during the time that the croſs-ploughing is going forward, he runs a great riſk of loſing his crop, or at leaſt of diminiſhing it to ſuch a degree, as totally to fruſtrate the intention of the experiment. He muſt therefore be extremely cautious how he begins this operation, if the weather appears to be precarious. If the weather be indeed unſettled, it will be better to forego the benefits to be derived by a croſs-ploughing, and rather content himſelf with ploughing it in ridges; by which the danger from *rain* will be thus diminiſhed, though in his experiment it will ſubject him to a crowd of leſſer evils, that he ought if poſſible to avoid. At any rate, when he is to begin his croſs-ploughing, he ought to bring all the ſtrength forward he can; to feed his horſes double, and make his ſervants perform as much work as poſſible. In ſhort, he himſelf muſt be conſtantly on the ſpot, to ſee that not a moment be loſt in puſhing the work forward, ſo as to get it put out of danger as quickly as poſſible: and beſides all this, he muſt be continually upon the watch, ſo as to be ready, it *rain*, in ſpite of all his precautions, ſhould ſurprize him, to

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(n) The Kentiſh turn-wreſt plough is a clumſy awkward implement, which is both weighty and weak, and does its work poorly. But there is a plough of this kind invented by a Mr. Small, near Edinburgh, in which he uſes two coulters; one of which is alternately put up as occaſion requires, and ſhifts the muzzle, coulter, and mold board all by one motion at turning, ſo as to make the plough at all times perform its work as well as a fixed plough, while it is at the ſame time very ſtrong, and ſo light as may be drawn by the ſmalleſt horſe, if required. This is the kind of plough I recommend for horſe-hoing; and if made large enough, would anſwer well in this place.

have the water-furrows drawn through it at any rate, before it can be drenched with moiſture. Thoſe farmers who are in the cuſtom of going to their beds, for weeks together, and ſleeping with tranquillity while their ground is in this precarious ſituation, will wonder at the anxiety I expreſs on this head; but their climate muſt be better, or their rents lower than in Scotland, or this could not be done.

The moment the croſs-ploughing is completed, the field ſhould be laid out, in the directions of the ridges, into breadths of three feet each, over its whole ſurface; and furrows drawn along each by means of a plough having a double mold board, with a very flat ſole, ſo as to mark a wide flat furrow; in which the potatoes are to be depoſited. This furrow ſhould only be from two to three inches deep, as was formerly ſaid. The plough for this purpoſe ſhould be drawn by two horſes yoked a-breaſt; not that ſuch a force is required to draw it, but in order that the horſes may tread on each ſide of the line in which the potatoes are to be depoſited, and thus not mar the reſult of the experiment.

While this operation is going forward, every thing ſhould be got in readineſs for planting, that no ſtop may be made in that operation. The ſets muſt all have been previouſly *weighed* (each ſet *individually*) and reduced to the preciſe weight of *two ounces* each. If there are many plants, this will be a tedious proceſs; and as the accuracy of the experiment depends upon this operation being performed with the moſt cautious fidelity, this part of the operation ſhould be entruſted to two perſons whoſe fidelity, care, and patience can be depended upon: and to inſure againſt the danger of mixing, this operation ſhould be done in a place where no potatoes are kept. Each kind ſhould be brought ſeparately into this place; and when they are all weighed, put up again, and carried away, the place ſhould be cleared, and all the chips ſweeped out before another kind be brought; and ſo on till the whole ſhall be completed: a line ſhould alſo be provided, that ſhould be divided into regular lengths of twelve inches each, by means of knots made upon it all along. No ſooner ſhould the furrows above mentioned be drawn, than this line ſhould be ſtretched along the middle of one of theſe furrows, ſo as to be quite ſtraight from end to end. The ſets are then to be depoſited by the ſide of that line (one at each knot) beginning at one ſide of the field, and proceeding regularly forward to the other; always planting out the whole of the ſets of one kind, before the bag containing another kind be opened; the *exact* number of ſets of each kind having been previouſly aſcertained by an enumeration thrice done, by different perſons.

To guard farther againſt inaccuracies, the firſt five or ſix rows next the edge of the field ſhould be planted with potatoes that are no part of the experiment; and the field ſhould be of ſuch a length as to contain the whole of the ſets of one kind either in one, two, or three rows, ſo as to keep them from being mixed in the ſame row. But in whatever way they are planted, five or ſix yards on each end of every row ought to be planted with potatoes *not* of the experiment, becauſe there is no certainty of guarding theſe from accidents by the horſes in turning, or otherwiſe. Theſe common kinds of potatoes ſhould be ſeparated from thoſe of the experiment, by an interval of a couple of yards; which may be planted with beans, to ſerve as an indelible mark of ſeparation. In this manner one kind may be made to ſucceed another, till the whole be finiſhed.

No ſooner ſhall the potatoes be planted, than another ſet of operators ſhould follow, to cover the ſets with rank ſtable-dung, provided for that purpoſe. This ſhould be laid lightly over each ſet, and ſo as to fill the whole of the trench to the height of three inches, or more, if the quantity can be got; and without loſs of time, a *deep* furrow, with a double mold boarded plough, drawn by two ſtout horſes, ſhould be drawn along the middle between each row, ſo as to cover the dung in part on each ſide, leaving a clear furrow between the rows for carrying off the water. When all this is done, the field is out of danger for that ſeaſon; and come what weather will, the crop will be abundant, if all theſe operations have been performed while the ground is in good tilth. It is *now* the labourers ſhould get a liberal entertainment; the certainty of which will animate each in his previous labours: and now alſo the ſuperintendant may take a ſound ſleep, without fear of being taken tardy. I am abundantly ſenſible of the tireſomeneſs of attending to theſe practical minutiæ; but unleſs they are to be attended to with the moſt ſcrupulous accuracy, experimental agriculture is a mere farce, and it ought never to be attempted. In the preſent caſe, an inaccuracy in ſome of theſe trifling circumſtances, may make a variation in the produce not of a few pounds only, but of ſome hundreds of pounds in the reſult; in conſequence of which the Board would not only do injuſtice to the competitors, but would lead the whole nation into a very great error. It was in ſome meaſure to guard againſt the proportional effect of a caſual error, which no caution can abſolutely inſure againſt, that I recommended the number of 1000 ſets as the *minimum* for this experiment. There is ſtill one other precaution that ought not to be omitted: It is not impoſſible but ſome of the competitors may contrive to ſlip in a few other ſorts among their ſets, in ſpite of every endeavour to guard againſt it: and in that caſe the beſt means of diſcovering the fraud is to examine the plants while growing, as the habit of the two kinds may be diſtinguiſhed, where the bulbs could not. If theſe appear, they ſhould be marked, and carefully compared with the others when lifted: and whereever ſuch mixture is found, that parcel ſhould be debarred from obtaining the premium. In another ſenſe is attention here required: When the potatoes are taking up, a perſon ſhould always attend to obſerve with great care wherever a plant that is uncommonly prolific appears; for in whatever way it has been produced, it ought not to be loſt. Theſe individual prolific plants ſhould be compared with each other, both as to weight and taſte; and if one is found greatly to exceed the others in theſe reſpects, it ought to be ſet apart for further trials. Nor needs this be a very tedious proceſs. I ſhould not be at all ſurprized to find the produce of one of theſe extra ſtems to be 20 or 25lbs: and if theſe ſhould be propagated with care (as deſcribed below) it would be no marvellous produce to reap from 12 to 1400 lb. the firſt crop.

The moſt troubleſome part of theſe operations, and what requires a nicety, accompanied by an expence that cannot be avoided in this caſe, is the bringing the dung upon the ground, and diſtributing it equally over the whole field. At the diſtance of twenty or one-and-twenty rows, a ſpace equal to three rows at leaſt muſt be appropriated for a road; the carts to come in at one end of the field, and to go off at the other end, the dung being depoſited at the proper places where wanted in that road. As ſoon as it is laid down, it muſt be put into ſhallow baſkets by aſſiſtants, and carried to the furrows, where it is to be finally depoſited; but in croſſing the rows, care muſt be taken that the carriers ſtep clear acroſs the rows, ſo as not to trample on the furrow where the potatoes are depoſited. After the whole has been thus dunged, the place where the road has been made muſt be ploughed up, laid out into rows afreſh, and planted with potatoes that do not enter into the experiment. No matter whether they be dunged or not.

After the field has thus been regularly laid up into ridges of three feet each, it ought to be horſe-hoed at the interval of a fortnight, or thereabout, between each time, if the weather permits, till the potatoe-ſtems are ſo far advanced as no longer to admit of it. This horſe-hoeing ſhould be performed in the following maner:

Suppoſe you to be poſſeſſed of one of the ploughs having a mold board that ſhifts (the operation *can* be performed with an unvarying plough, with certain precautions that need not here be ſpecified); begin at one ſide of the field, and in the furrow that is in the middle, between the *firſt* and the *ſecond* rows, let a horſe go ſo as to allow the plough he draws to take ſome earth from the ſide next the *firſt* row, and lay it towards the *ſecond*; then turn; and having ſhifted the plough, return in the furrow that has juſt been made; and taking a narrow furrow and pretty deep, lay as much more earth ſtill from the *firſt* row towards the *ſecond* as you can with ſafety, ſo as to come as near to the firſt row as can be done without diſturbing the plants; then go up the furrow between the ſecond and third rows in the ſame manner, turning the earth from the ſecond towards the third row, repeating the ſame operations to each over the whole field, till you come to the oppoſite ſide, in which ſtate the furrows will all be brought quite cloſe to the rows, *upon one ſide*, and the earth will be laid towards them *on the other*. The next hoeing is to be performed by directly reverſing this operation, ſo that the earth will now be turned towards that ſide of the rows where the furrows were before, and the furrows will all come to be laid open on the *other* ſide of the rows; but the operation muſt be ſo conducted as that the earth ſhall always be laid towards the one ſide of the row before the furrow be opened upon the other ſide of it. In this way the place in which the plants grow, being always ſupported by the weight of the earth that lies at the oppoſite ſide to where the plough is cutting, gives ſuch a reſiſtance as to keep it firm, and to allow the plough to come as cloſe to the plants as ſhall be deemed proper, without danger of diſturbing them: and as there is always a body of freſh moiſt earth (at *one* ſide at leaſt of the row of plants) into which the roots are at liberty to ſtrike with eaſe, the plants are never in danger of being withered by drought, as when the earth is drawn from both ſides of them at once, in the ordinary way of horſe-hoeing. I have practiſed this mode of horſe-hoeing for many years paſt, on cabbages, turnips, and potatoes, and can ſafely ſay it is one of the greateſt improvements I have ſeen in the practical department of agriculture: and it is ſo much eaſier to perform, and ſo much more pleaſing in every part of the operation, that no one who has once experienced it will ever think of adopting the common practice in this reſpect.

Weeds in the rows muſt be effectually extirpated wherever they appear; and at every horſe-hoeing the earth muſt be raiſed a little higher upon the plants than before, till at laſt, when, if the dung ſhould not be entirely covered by the plough, a perſon with a ſhovel ought to cloſe up lightly any imperfections.

The plants will then advance with ſo much vigour, that unleſs it be thoſe kinds that have weak or ſticky unbranching ſtems, they will effectually keep down all weeds, and will require no farther attention till the time they are to be lifted. But if any weeds ſhould appear, they muſt be carefully extirpated by a very ſharp hoe, or hand-weeding, as ſoon as they are fit to bear theſe operations.

When the potatoes are ripe, a dry time ſhould be choſen for lifting them. They ſhould be lifted (each kind by itſelf) by means of a ſpade, which is a very convenient tool for this purpoſe; two young perſons being employed to gather for every ſpadeſman. The produce ſhould be immediately carried home, each kind by itſelf, and weighed and depoſited in ſome place where it is in no danger of being intermixed with any other kind.

In this manner the proportional produce, and the time of ripening each kind, will be accurately aſcertained. There will be more difficulty in aſcertaining their relative value in reſpect to taſte. This can be aſcertained only in conſequence of repeated comparative trials by different perſons, who know nothing of the kinds; and that kind to be preferred which, on an average of trials, ſhall be found to obtain the greateſt number of votes.

When the beſt kind ſhall be thus ſelected, it ſhould be diſtinguiſhed by a particular name, and the premium awarded to the perſon who ſhall have been found to be entitled to it (no premium to be given unleſs the produce ſhall exceed the rate of thirty tons per acre): and if the Board ſhould think proper to aſſign ſmaller premiums to the ſecond beſt, the third, and ſo on, let each of theſe alſo be aſcertained, and named in like manner: after which a faithful account of the kinds and quantity of produce of each ſhould be publiſhed in the newſpapers, for the information of the public, and the produce of the different kinds advertiſed for ſale: the beſt kind, at the rate of one ſhilling a pound, to be made up into parcels of five, ten, fifteen, twenty, and twenty-five pounds each. No quantity exceeding twenty-five pounds to be given to any ſingle perſon, nor any of them to be diſtributed in preſents. By this means, curious perſons in every part of the country would have an opportunity of obtaining the true ſort: and as to the price, I know from experience that the only way of making any thing be attended to and preſerved, is to ſell it at a good price; ſo that by this means the breed will be carefully preſerved till it be ſufficiently increaſed to become univerſal: whereas, if it were given away in preſents, or at a ſmall price, people would be careleſs about it, and there would be a chance that it might be loſt in a very ſhort time, or monopolized by a very few hands.

The other kinds might be in the ſame manner advertiſed, and ſold at ſuch inferior prices as ſhould be deemed beſt.

Along with each parcel, printed directions ſhould be ſent, for increaſing theſe kinds as quickly as poſſible; becauſe, where a great increaſe from a ſmall weight of ſets is the chief object aimed at, a very different mode of management is required from that which muſt be followed where the greateſt quantity of produce from a given extent of ground is the object.

From my experiments, it was as clearly proved that the greateſt produce from the ſame *weight of potatoes* was obtained from the *ſmalleſt* ſets, as that the greateſt produce from the ſame *extent of ground* was obtained from the *largeſt* ſets. The increaſe of *weight* from *large* ſets, was from *three* to *four* times that of the ſeed planted; whereas from *ſmall* ſets it ran from *thirty* to *forty*. Hence it will follow, that thoſe who get theſe new kinds of potatoes, ought to be directed to cut them into as many pieces as there are prolific eyes (always excluding the hollow where the umbilical fibre was attached to the potatoe) leaving *one* eye only in each ſet: taking care to cut up the potatoe in ſuch a way, as to make each of the ſets to contain as nearly as poſſible the ſame quantity of matter; which, with a little care can be eaſily done. The plants being thus divided, ſhould be planted in rich well prepared ground, well dunged, in rows three feet apart, and at eighteen inches from each other in the rows; the ground to be carefully hoed, and well managed in every reſpect; under which management there is little reaſon to fear but that the quantity would be augmented fiftyfold during the firſt year; ſo that an abundant ſupply could ſoon be thus obtained to ſtock the whole country; and while this proceſs was going forward, the ſuperior price that would be obtained for the ſets, would make up for any deficiency that might be incurred as to the quantum of crop from the ſame extent of ground.

It is by no means impoſſible but that, by one premium thus applied, the thing wanted might be obtained; but as there would be ſtill a chance for new improvements, the ſame premium might be offered a ſecond year, or oftener; but always with this proviſo, that no premium would be given unleſs for thoſe new kinds that were found, upon a fair comparative trial, to exceed the old: and with a view to make that comparative trial with accuracy, as many ſets of the beſt kind ſhould be reſerved, as to be ſufficient to make the trial.

Hitherto I have ſuppoſed the experiments are confined to thoſe kinds of potatoes that come to perfection before the firſt of Auguſt (for great are the benefits to be derived from early ſorts, in compariſon of thoſe that are later); but as any kind of potatoe that arrives at perfection before the firſt of October may be very uſeful, it might perhaps be adviſeable to offer the ſame premium each alternate year (as long as the Board ſhould chooſe to continue them) for the beſt kind that ſhould produce the greateſt produce (not under at the rate of *forty* tons per acre) that had attained their full maturity in an ordinary ſeaſon before the *firſt of October*. I ſet the quantity of theſe laſt at ten tons larger than the former, becauſe I think it is not only poſſible to attain that produce, but likewiſe becauſe I ſhould ſuppoſe the value of thirty tons of the firſt would be, on an average of years, equal to that of forty tons of the laſt; for which reaſon none but thoſe of a very great prolificacy ought to be admitted to a competition.

I ſhall not add more to the length of this Eſſay, than barely to take notice of one peculiarity of the potatoe that ought not to be overlooked. There are doubtleſs potatoes, like apples, which eat beſt when juſt pulled from the tree, and loſe their flavour very ſoon by keeping; ſome kinds eat beſt when newly taken out of the ground, and gradually become worſe the longer they are kept. There are others which, on the contrary, are very indifferent when newly dug up, that gradually get better, and come to their perfection only in the ſpring of the year. I had once a kind that was very indifferent for eating till towards the month of March; but which, from that period till the month of Auguſt, if care was taken to prevent it from germinating, continued as mellow and mealy as could be deſired. This is a very valuable peculiarity, and ought not to be diſregarded in a diſquiſition of this ſort.

P. S. I find I have forgot to take notice, that on the plan of premiums propoſed, the firſt comparative trial could not take place till three years, at leaſt, from the time of advertiſing it; as that ſpace would, at leaſt, be required for increaſing the plants from the ſelected kinds. Indeed it would require four, five, or ſix years before the experiment could be tried with the faireſt proſpect of ſucceſs; ſo that if the premium was to be continued for ſucceeding years, it ſhould be ſo announced at the beginning, that people may prepare themſelves for it. Experiments in agriculture are ſlow; nor is it poſſible to accelerate them beyond the limits that nature has preſcribed; whoever attempts it muſt have the mortification to ſee their aims entirely fruſtrated. How many excellent improvements have I known neglected, becauſe in looking forward to them, the time to bring them to perfection appeared to be long; yet when that time was paſt, it ſeemed very ſhort, and the mind was filled with regret that the improvement had not been made! Yet the ſame conſideration prevented the attempt a ſecond and a third time; and that thing was never done, which, in the courſe of the ſame man's life, might have been done perhaps a dozen times over.

No. VI.

Memoir for the Conſideration of the Honourable Board of Agriculture, on the Cultivation of Potatoes, by Mr. Somerville, of Haddington, March 9, 1795.

PREVIOUS to entering upon the Queries propoſed by the Board, it is preſumed that a few preliminary obſervations reſpecting the advantages that have already been derived from the introduction of potatoes into this iſland, and which are likely to follow a more extenſive cultivation of them, will not be deemed altogether uſeleſs.

In a country, ſuch as Great Britain, where the population is upon the increaſe, and where the produce of the earth com. an. is either inadequate to or barely ſufficient for the wants of the inhabitants, any plan that can increaſe the quantity of human food muſt be a matter of great national importance, as by that means proviſion is made for the comfort of the induſtrious part of the community; the dependence of the country upon foreign nations is leſſened; and by this diminution of our wants the balance of trade is turned in our favour.

Since the firſt introduction of potatoes into Great Britain, theſe important objects have been promoted in a great degree; and there is every reaſon to believe, that from an increaſed cultivation of that valuable root, they may be completely obtained.

Circumſtances, which it is unneceſſary here to detail, have operated to raiſe the price of every ſort of grain to nearly double what it was forty years ago: about that time the cultivation of potatoes began to be attended to; ſince which, it has gradually increaſed: the conſequence has been, that of its affording a cheap and wholeſome ſubſtitute for bread, and by that means enabling the middle and lower ranks to maintain themſelves in a ſtate of comfort; which, without the aid of this valuable root, they would have found it impoſſible to do.

In this way a juſt balance has been preſerved; and all that part of the higher and middle ranks, where incomes are limited, ſuch as the clergy and annuitants of every deſcription, together with the whole of the lower claſs, whoſe wages have by no means kept pace with the times, are not only prevented from feeling the miſery which the riſe in the price of grain would have occaſioned, but are abſolutely more comfortable than they were when the prices of theſe commodities were much lower.

The following advantages reſult from the cultivation of potatoes:

1ſt. Potatoes, from the great quantity produced upon an acre, when compared to the returns in grain, form a very conſiderable addition to the quantity of human food.

2dly. They are an excellent ſubſtitute for grain in the feeding of horſes and other animals. In this way they ſtill farther increaſe the food of man.

3dly. They can be profitably employed as ſubſtitutes for flour in various branches of manufacture; ſuch as *ſtarch*, *hair-powder*, and the whole of the other branches of manufacture where ſtarch is uſed; which upon enquiry will be found very numerous. In this way a ſtill farther addition is made to the food of man.

4thly. This increaſe of human food has a very conſiderable effect in diminiſhing the price of labour, and thereby leſſening the expence of every operation; the effects of which, in agriculture and manufactures, are extremely obvious.

5thly. They can be raiſed, in perfection and abundance, upon lands that would afford very poor returns of any other produce.

6thly. Can be raiſed without manure; and ſucceſſive crops may be taken from the ſame ground with ſafety.

7thly. Are well calculated to promote the improvement of waſte lands.

8thly. Are a good ſubſtitute for fallows upon foul lands.

9thly. Afford employment for an additional number of hands.

Having enumerated the advantages ariſing from the cultivation of potatoes, we now proceed to make a few remarks upon each of them. In the firſt place, as a much greater quantity of potatoes can be raiſed upon a given ſpace of ground than of any other produce, the quantity of food muſt be increaſed in the ſame proportion. This affords to all ranks, but eſpecially to the poor, a cheap and wholeſome ſubſtitute for bread and oatmeal. Nor is this the only advantage; as potatoes are now found an excellent food for horſes, hogs, and feeding cattle, a very great proportion of the grain that was formerly and is ſtill uſed in feeding theſe animals, may be employed in ſupporting an increaſed population.

They can alſo be employed with ſucceſs in the manufacture of ſtarch, hair-powder, and ſeveral other branches, where a conſiderable quantity of the very beſt wheat is at preſent uſed. Starch of a very fine quality is at preſent made from potatoes; as alſo hair-powder, and even flour for bread; and there is great reaſon to believe that, with proper attention, they may be manufactured with as much care as wheat into ſtarch. They will alſo be found a good dreſſing for linen and cotton webs in the loom, and thereby leſſen the conſumption of wheat flour for that purpoſe. Should they be found a good ſubſtitute for wheat for theſe purpoſes, a ſtill farther addition will be made to the ſuſtenance of man.

This increaſe of the neceſſaries of life will be attended with immediate comfort and advantage to all ranks, but eſpecially the poor. It will powerfully promote the population of theſe kingdoms; and by enabling the labourer and mechanic to live at a cheap and eaſy rate, the price of every operation will be leſſened. The benefit ariſing from this diminution in the price of labour will be very great, both in agriculture and the arts. The huſbandman will work his farm at leſs expence, and the manufacturer will be enabled to bring his goods to the market at a lower price; which will give the manufactures of Great Britain an advantage over thoſe of other countries, where the neceſſaries of life are leſs plenty, and bear a higher price; for in all caſes where there is a rivalſhip between two nations, with regard to markets, the balance will always lean to the ſide of that one where living is cheapeſt, provided that all other circumſtances are equal.

Theſe advantages would be felt more or leſs, even if potatoes were to be cultivated only upon a part of the lands that are at preſent under tillage, as they produce ſo much more food in that way than any other; but they deſerve a ſtill more decided preference, from the circumſtance of their being raiſed in great perfection and abundance upon lands that would afford very poor returns of any kind of corn crop; and, what is well worth the attention of farmers, they can be raiſed even upon thoſe poor lands without manure; and ſucceſſive crops may be had without injuring the ſoil.

This circumſtance of their being raiſed with ſo much eaſe upon very poor ſoils, is a powerful incentive to the cultivation and improvement of waſte lands; the principal bar to which, at preſent, is the great expence that is required to put waſte grounds in a ſituation for corn crops. This, as we ſhall afterwards notice when we come to ſpeak of the proper mode of cultivating the potatoe, can be very effectually accompliſhed with little labour or expence, by making potatoes the firſt crop, and planting them upon the turf. This admits of being practiſed upon almoſt every deſcription of ſoil, even moor and ſpongy moſs, provided only that they can be laid tolerably dry. Indeed in many caſes where the lands are exceedingly wet, particularly ſoft moſſy ſoils, very great crops are raiſed in what is called the lazy-bed way, upon ridges of twelve or fourteen feet wide, with a deep trench by way of open drain between each, for carrying off the water.

When they are planted upon the beſt lands, they will be found, under proper management, an excellent ſubſtitute for fallows where the land is dirty, eſpecially if the weeds are chiefly annuals: even couch-graſs, and many of the moſt troubleſome root-weeds, may be in this way deſtroyed, if proper attention is paid during the ſummer; but to do this effectually, requires conſiderably more labour than is uſually beſtowed upon potatoe-crops. This will be pointed out in another part of the preſent Memoir.

The laſt advantage which we ſhall take notice of as reſulting from an increaſed cultivation of potatoes, is the employment that will by that means be afforded to the poor. We have already obſerved, that a very great part of the benefit to be derived from this plan, ariſes from their being eaſily cultivated upon poor lands and waſtes, where corn crops would not grow with *profit* to the farmer or the public. It is evident that more land will be laboured by this means, and an additional number of hands will be required for that purpoſe; nor is the ordinary labour of preparing the ground and putting in the crop all that will be neceſſary; the ſubſequent operations will require the labour of many hands of all ages; and in this manner employment will be found to thoſe people for a conſiderable part of the year. In another Memoir, which will ſhortly be preſented to the Board, reſpecting the growth and management of flax, it will be ſhewn, that abundant employment will be found for thoſe people during the remaining part of the year, in the manufacturing of that valuable article; which, as we ſhall alſo make appear, can be raiſed with equal facility and advantage upon moory and moſſy ſoils.

Having premiſed theſe obſervations, which we truſt will not be deemed ſuperfluous, we come now to conſider the Queries propoſed by the Board.

QUERE I. "What are the beſt kinds of potatoes, and the beſt mode "of culture?"

To enumerate all the different kinds that are at preſent known, would anſwer no uſeful purpoſe, as many of them are not only of a bad quality, but alſo unfruitful. The moſt approved kinds are the following:

EARLY POTATOES.

1. Dwarf Early, Round, and Kidney.
2. Royal, or Cumberland Early.

LATE.

1. Large White Kidney.
2. Killimanca, or Icanie.
3. Blackamore.
4. Winter Red Round.
5. Ditto Long, with a great number of eyes.

FOR CATTLE.

1. Ox-Noble, or Cluſter Potatoe. (*a*)
2. Yam, or Surinam Potatoe. (*b*)

The above are what experience has ſhewn to be the beſt and moſt profitable kinds; but as there is ſome difference in the nature, and certain peculiarities in the cultivation of each, we ſhall take notice of them ſeparately.

1. Dwarf Early Round Potatoe.

This potatoe is of a ſmall ſize, and is cultivated chiefly as a luxury for the table, as it ripens very early in the ſeaſon. The returns, in point of bulk, are by no means equal to what is obtained from any other potatoe; but this deficiency in the crop is more than compenſated by the high price which they bring, and the opportunity that is afforded of putting another crop upon the ground at an early period of the ſeaſon. As an article of profit to the cultivator, they deſerve attention; but as furniſhing a bulk or

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(*a*) The Ox-Noble is not the Cluſter.
(*b*) The Surinam and Cluſter, one and the ſame.

eſſential part of food, they weigh little in the ſcale. Indeed, in many parts of the iſland, the planting of them is in a great meaſure laid aſide ſince the introduction of a new kind, which the author of this paper has himſelf planted frequently with ſucceſs, but is at a loſs for a name: that by which it is known in Eaſt Lothian, is the

2. Royal, or Cumberland Early.

This potatoe is of a large ſize, very prolific, of an excellent flavour, and ripens early enough to admit of the ground being employed either in raiſing another crop of the ſame potatoes, or a crop of white peaſe, turnips, cabbages, or green kail. Theſe circumſtances render it a valuable acquiſition; and there is little doubt that in a ſhort time it will go a great way to ſupplant every other kind. What gives this potatoe a decided preference is, that it is ready at a time when the price of grain and other neceſſaries of life are at the higheſt; that is, between the old and the new crop. Perhaps there is no ſeaſon of the year at which the lower orders of ſociety feel greater ſtraits, particularly the poorer ſort of trades-people and manufacturers. The compoſt which they would derive from a plentiful ſupply of potatoes at that ſeaſon would be great, almoſt beyond deſcription; and the benefit reſulting to the public would be in the ſame proportion.

It cannot therefore be too earneſtly recommended to every deſcription of perſons concerned in agriculture, whether farmers or proprietors, to encourage the cultivation of this kind of early potatoe, as it affords an increaſe nearly equal to any of the late kinds; is ripe at that ſeaſon when other articles of ſubſiſtence are high-priced, and can be ſeparated from the ground early enough to admit of its being profitably employed in raiſing another crop. It is found to ſucceed admirably upon ſtrong clays. To ſay more upon theſe advantages would be ſuperfluous, as they muſt appear ſufficiently obvious to every perſon who is in the leaſt acquainted with agriculture.

LATE POTATOES FOR THE TABLE.

1. Large White Kidney.

This potatoe is of an oblong ſhape, rather thin in proportion to its length, round at the extremities, one of which is broader than the other; the colour is uniformly white, and the ſkin ſmooth. It derives its name from the ſtriking reſemblance it has to *a kidney*. This potatoe, in its perfect ſtate, is very prolific, and arrives at maturity ſooner than any other of the late kinds: on that account, it deſerves a preference; and as it ſeems to delight in light ſoils, it is perhaps the only kind that ſhould be cultivated upon ſuch lands.

2. Killimanca, or Icanie.

This potatoe ſeems to poſſeſs the properties of the Kidney, combined with thoſe of the Long Red. It is generally red at one of the extremities, poſſeſſes the delicate flavour of the Kidney, but contains rather fewer watery juices, or, commonly ſpeaking, is more mealy; and, like the Red potatoe, keeps longer, and ſeems rather to improve in flavour in the ſpring. It is very prolific, and, what ſeems an advantage, is leſs ſuſceptible of the curl than the former. Both the large Kidney and the Killimanca, if planted in March, may be taken off the ground early enough to admit either of a broad-caſt crop of turnips, to be eaten off with ſheep in the ſpring, or a crop of green kail or coleworts; all of which will be found valuable, from their affording green food to ſheep or cattle at that time, when herbage is ſcarce; that is, between the end of the turnip ſeaſon and the beginning of the graſs; and, after all, the ground will be able to produce a barley crop without any difficulty: or, if that ſhould be judged too late, turnips or early white peaſe may be raiſed with great advantage upon it.

3. Blackamore.

This potatoe has of late been much cultivated; it grows to a great ſize, is very prolific, of a fine flavour, keeps equally well with the red kinds, and can be cultivated in great perfection upon deep loams or ſtrong clays. It is, however, longer in ripening than any of the others, which prevents the ground from being afterwards employed in raiſing other crops. What forms a very great ſingularity in the nature of this potatoe is, that early planting ſeems to have very little effect in haſtening its maturity, nor is it much retarded though planted very late. The author of this memoir has repeatedly planted it about the end of June, and towards the end of September or beginning of October has reaped very abundant crops.

Though this circumſtance in a great meaſure precludes the chance of the land being profitably employed after they are taken up, it holds out an equal proſpect of advantage, from the ground being occupied by an early crop, previous to their being planted: for this purpoſe nothing promiſes to be more profitable than either a crop of the beſt early potatoes, or one of early cabbages; both of which, if judiciouſly managed, may be ſeparated from the ground early in June. Indeed the ſame thing may be done with profitable ſucceſs with both the red kinds.

4 and 5. Winter Red, both ſorts.

Theſe two kinds of potatoes, though differing in appearance, ſeem to poſſeſs nearly the ſame qualities; they reſemble each other in taſte and flavour, ripen at the ſame time; both of them grow well upon ſtrong clay and heavy loams, and both ſeem to be in the higheſt degree of perfection in the ſpring.

This laſt is no inconſiderable advantage, as they can with little trouble be kept freſh and palatable till after Midſummer; but the circumſtance of their delighting in a clay ſoil, renders them highly valuable in ſituations where the ſoil is moſtly of that kind, and where the other ſorts, if planted, would both be of a watery inferior quality, and would alſo be very unproductive.

POTATOES FOR CATTLE.

Cluſter Potatoe and Yam.

Both of theſe kinds are cultivated only for feeding cattle, for which they ſeem well adapted; but from the harſhneſs of their taſte, they are unfit for culinary purpoſes. They, however, poſſeſs certain peculiarities which render them highly valuable for the feeding of ſtock.

From the circumſtance of their keeping long, and being eaſily preſerved through the winter, they will be found highly uſeful for feeding ſheep and cattle after the turnips are finiſhed. By this means the interval between the turnip and graſs feeding will be in a great meaſure filled up, and the farmer will be enabled to carry on and complete the fattening of both ſheep and cattle, which he would otherwiſe have been obliged to diſpoſe of for want of ſpring food. We are perfectly convinced, that this part of rural œconomy has been too little attended to; and from ſeveral ſucceſsful experiments which we have ſeen tried, we are enabled to ſay, that either the Cluſter potatoe or Yam can be uſed with ſingular advantage for feeding; and what adds to their value is, that cattle who have made ſome progreſs in fattening upon turnips, thrive amazingly when put upon Yams, or any of the coarſe potatoes.

There is, however, a very material difference between this root and turnips; for the greateſt benefit of turnips is met with when they are given in a raw ſtate; whereas Yams, and indeed every other kind of potatoes, produce the beſt effects when boiled. This operation may ſeem to deter many from the practice; but when it is conſidered that it can be done by ſteam, with the aſſiſtance of a very ſmall fire, and without any trouble, it is to be hoped the objection will be done away. We do not, however, recommend conſtant feeding with them in a boiled ſtate; half a feed, at leaſt, ſhould be given raw every day, for the purpoſe of keeping the belly of the animal open.

We cannot therefore preſs the cultivation of this valuable root too ſtrongly upon the minds of all concerned, as it will certainly lead to advantages beyond what moſt people imagine. We have already ſaid, that they are well calculated either for finiſhing the feeding of cattle that have made ſome progreſs upon turnips, or for carrying them on during the interval between the end of the turnips and the beginning of the graſs crops. They will alſo be found excellent for feeding work-horſes, and as an article of food for the young ſtock of horſes and cattle of every deſcription: they always eat them readily, and are found to grow and thrive better than when they are fed upon corn in the uſual way. This circumſtance is not only an encouragement to breed more extenſively than is at preſent done upon the arable farms, but will be a very great relief and advantage to the ſtore-farmers in the hilly and upland parts of the country. Their principal dependence for winter food, at preſent, is upon the ſmall quantity of coarſe ſpotted meadow-hay: a ſpecies of fodder, which nothing but the ſtrongeſt neceſſity can bring the cattle to eat; and which, though it does keep them alive, their growth is checked, and any fleſh they may have acquired in ſummer, is loſt during the winter; and when the ſpring arrives, they are mere ſkeletons.

By this means two-thirds of the ſummer is ſpent before they are again in any ſort of condition; no great quantity of fleſh can be acquired during the remaining part of the ſeaſon (very little progreſs is made in their growth) and when winter returns they again take a retrograde courſe. In this way they hardly grow as much in five years as they would in two and an half, if they were well fed, and kept in a growing ſtate during the winter.

In place of this wretched ſyſtem of rearing cattle, if breeding-farmers were to cultivate a few acres of Yams, or any of the coarſe potatoes yearly (and there are few ſituations where this may not be done with great advantage) and commence feeding their young ſtock with them as ſoon as the paſture becomes ſcanty, this food, in addition to the meadow-hay, would not only preſerve them in good condition, but would alſo keep them in a growing ſtate during the winter. The tender ſucculent herbage in the ſpring would then have a ſurprizing effect in ſwelling and increaſing their growth.

It is truly ſurprizing what progreſs both young cattle and ſheep make when managed in this way. The experiment has been frequently made by judicious breeders; and the reſult is, that both ſheep and cattle that are well fed through the winter, are of a larger ſize, and of more value when they are two and an half years old, than thoſe that are reared in the ordinary way commonly are when double that age.

This circumſtance renders the cultivation of coarſe potatoes a moſt important and intereſting affair in that branch of rural œconomy which we have juſt now mentioned.

Valuable for feeding Winterers. They will alſo be found highly valuable for feeding that ſpecies of ſtock known by the name of Winterers. It is now cuſtomary for all or moſt of the corn-farmers, who make graſs or broad clover a part of their rotation, to purchaſe a certain number of lean cattle about the middle or end of November, for the purpoſe of feeding them upon their paſture the enſuing ſummer. Theſe cattle, which are for the moſt part very lean when they are bought in, are turned into an open and very often a wet yard; left expoſed to every inclemency of the weather during the whole winter, and fed only upon dry ſtraw, ſometimes not of the beſt quality, till the beginning or middle of April; when they are turned out to paſture in a ſituation little better than carrion. The firſt effect which the graſs has upon them is to produce a purging, which laſts for a fortnight, ſometimes more; this, added to the weak debilitated ſtate they are in when they come from the ſtraw-yard, brings them ſo low, that many of them die, merely from this previous debility and the exceſſive evacuation occaſioned by the young graſs. Thoſe who ſurvive, or eſcape this diſeaſe, are generally ſix weeks before they exhibit the leaſt appearance of thriving; and even in the moſt favourable caſes, the ſeaſon is very far advanced before they can be properly fattened.

In this way the prime of the graſs (in place of being employed in feeding healthy well-conditioned cattle, which might be ready for the market in May or the beginning of June) is waſted upon a parcel of poor emaciated animals, many of whom it kills at the beginning of the ſeaſon.

Were a contrary method followed; were theſe winterers kept in a dry yard, ſurrounded by ſhades during the winter ſeaſon, and each of them allowed a feed of Yams, or any other potatoes, once a day, in addition to the ſtraw, they would get into good condition during the winter, would be leſs liable to weakneſs and purging when put upon the new graſs, and would be ready for the butcher in one-third of the time. Where this practice is followed, and ſeveral of the Engliſh farmers have already adopted it, they are enabled to turn off three ſets of fat beaſts yearly from their paſtures in place of one. Intelligent farmers will readily perceive the reaſon of this difference: The firſt ſet being ſtrong, and in good condition when they are turned out, have no difficulty to contend with; ſuch as ſcouring, weakneſs, &c. they therefore begin to feed from the firſt day they are turned out; and the rich nouriſhing quality of the herbage at that ſeaſon, completes their fattening in a very ſhort time: generally in ſix or eight weeks they are fit for the market. At this time, if the farmer wiſhes it, the paſture can be reſerved for hay; or if that is not judged proper for the land, another ſet of beaſts can be put on, which will be ready by Midſummer. The paſture may then be ſpared till the latter end of autumn, when the fog will be found rank and good, and may be employed either in feeding off another ſet, or in preparing ſuch as are to be fed upon turnips through the winter.

By this plan every feeder has it in his power to turn off three ſets of cattle yearly, in place of one; merely by giving the ſtock intended to be fed through the ſummer a moderate allowance of Yams, or any other kind of potatoe, in addition to their ſtraw, during the preceding winter. This practice, and the advantages ariſing from it, when contraſted with the ordinary way of turning out lean winterers to graſs in the ſpring, and the poor returns that are made by doing ſo, will, it is hoped, operate with every man of ſenſe as a ſufficient inducement to make him attend to the cultivation of potatoes for this purpoſe.

For Milch Cows. For this ſpecies of ſtock every kind of potatoe will be found an excellent winter food, as they are not only calculated to keep the cows in good heart, but tend greatly to increaſe the quantity of milk. This laſt is a matter of high importance in the vicinity of great towns, where there is a conſtant demand for the produce of the dairy, and where every article of that produce ſells at a high price during the winter. It has for ſome years been cuſtomary to feed milch cows in great towns upon cabbages and turnips during the winter; but the rank diſagreeable flavour which they communicate to the milk, is a very conſiderable drawback upon this kind of feeding. Every ſpecies of potatoes is in a great meaſure free from this, even in their raw ſtate; but when boiled, they are completely ſo.

To the inhabitants of great towns, and to perſons renting land in their immediate neighbourhood, the introduction of this kind of feeding will be found a matter both of comfort and emolument; it will contribute to render milk and butter plenty during the winter months, and will conſiderably increaſe the value of property in theſe ſituations.

For feeding of Hogs. Hitherto the uſe of potatoes in the feeding of hogs has been either neglected or improperly underſtood. Till within theſe few years, it has been cuſtomary to give them entirely raw. This mode of feeding, though it will keep the animals in tolerably good condition, will not fatten them; but when the potatoes are boiled, a much ſmaller quantity than is commonly given raw will be found ſufficient to render them fit for the butchers. Their fattening is much haſtened by mixing a ſmall quantity of any aſtringent ſubſtance amongſt the potatoes, eſpecially if they ſhow the leaſt tendency to purging. A very cheap and efficacious remedy for this purpoſe will be found in the *Armenian Bole*: an earth which poſſeſſes conſiderable aſtringent powers, and which has no diſagreeable taſte. Even a little allum in powder may be mixed with their food; and from the agreeable acidity which it communicates, will make them eat it with reliſh.

For Fowls. Boiled potatoes are found an excellent food for fowls of almoſt every deſcription, with a ſmall mixture of bran or oatmeal. By adopting the uſe of them for this purpoſe, a conſiderable quantity of grain may be ſaved, not only in the maintenance of the preſent ſtock, but double the number may be kept, and made fit for the market, at leſs expence than the preſent ſmall ſtock that is reared.

Some may be diſpoſed to think the benefit ariſing from this ſubſtitute for the feeding of fowls a matter of little importance; and in ſome ſituations this may really be the caſe; but when it is taken upon a broad ſcale, and the quantity of grain that is conſumed over the whole kingdom, for this purpoſe alone, is conſidered, the aggregate will be found to be great indeed. But when to this advantage is added the benefit ariſing from feeding double, or even more than double, the number at leſs expence, it will then appear a matter of ſerious conſideration.

A Food for Dogs. The number of dogs kept in the iſland is conſiderable, and the quantity of food employed in ſupporting them very great. The articles chiefly made uſe of for this purpoſe are oatmeal and the coarſer parts of butchers meat. Theſe are not only expenſive articles, but a conſiderable quantity of human food is waſted in this way, eſpecially where large packs of fox or hare-hounds are kept. Even pointers and greyhounds conſume an immenſe deal of meal and other articles.

As a ſubſtitute for theſe, potatoes may be employed; and from experience we are enabled to ſay, that they will anſwer this purpoſe very completely. Some preparation, however, is neceſſary to make them palatable: they ought to be boiled to a pulp, with the addition of a ſmall quantity either of coarſe fat or ſalt butter, which will at firſt be an inducement for the dogs to eat them; it may afterwards be withdrawn by degrees, and they will then eat them readily, without any addition whatever.

To render them completely uſeful in this way, they ſhould firſt be thoroughly boiled, and afterwards haſhed down amongſt boiling water, taking care to incorporate them with the water till they attain the conſiſtence of thin ſtarch, when the dogs will lick them without the ſmalleſt difficulty. With this feeding, with the addition of ox-livers, and occaſionally of horſe-fleſh boiled along with the potatoes, they may be kept both in good fleſh and wind, at one-fourth of the expence which trained dogs generally coſt.

Theſe are not merely ſpeculative opinions; the author of the preſent memoir has employed them himſelf in ſeveral of the inſtances he has mentioned, and has known them ſucceſsfully employed by others in all of them:

and he is perſuaded, that to make them generally uſed, they require only to be generally known.

Theſe advantages ariſing from the uſe of potatoes in the rearing and fattening of the different claſſes of domeſtic animals, are no doubt very conſiderable; but when to theſe we add the increaſe of human food that is derived from the cultivation of potatoes, the improvement that will be made upon waſte and poor lands, and the advantages reſulting therefrom both with regard to agriculture and manufactures, we truſt that no additional arguments need be uſed to convince both the legiſlature and individuals of the immenſe benefit that will ariſe to every deſcription of perſons concerned either in the property or cultivation of the ſoil.

Having thus mentioned, at conſiderable length, the beſt kinds of potatoes, the purpoſes to which they may be reſpectively applied, and the advantages attending the uſe of them, we now proceed to mention the mode of cultivation.

In the former part of this memoir we have taken notice, that a very conſiderable part of the benefit reſulting from the increaſed cultivation of this root, will ariſe from the circumſtance of its being raiſed with little trouble upon moſſy, muiry, or waſte lands; the next advantage ariſes from their being raiſed without manure. This enables the farmer to apply the whole of his dung, &c. to his corn-crops: a circumſtance of very conſiderable importance. This practice may be ſucceſsfully followed, except in a very few inſtances, where the ſoil is either a light gravel or ſand: in theſe caſes potatoes will not thrive without manure.

Cultivation of the Early Potatoe. We ſhall firſt take notice of the mode of cultivating the early potatoe. In different places different contrivances are made uſe of, not only to have the crop as early as poſſible, but alſo to have ſucceſſive crops upon the ſame field in the courſe of one ſeaſon. The moſt approved of theſe ſeems to be that practiſed in the county of Lancaſter; which we beg leave to quote in the Surveyor's own words, taken from the 32d page of that Report.

"They cut the ſets, and put them on a room floor where a ſtrong current of air can be introduced at pleaſure; they are laid thin, about two "or three lays in depth, and covered with oat-ſhells, or ſaw-duſt, to the "thickneſs of two or three inches: this, at the ſame time that it ſcreens "them from the froſt, affords a moderate degree of warmth, which cauſes "them to vegetate, but at the ſame time admits air enough to harden the "ſhoots: the doors and windows are opened as often as the weather is "mild enough to admit of its being done with ſafety. The ſets are fre-"quently examined, and when the ſhoots have ſprung an inch and an half "or two inches, the covering is carefully removed, either with a wooden "rake, or with the fingers. In this manner they remain till the planting.

“ ſeaſon, taking care to give them all the air poſſible by the doors and
“ windows, when it can be done with ſafety: by this method the ſhoots
“ become green, put out leaves, and are moderately hardy. In this way
“ four crops have been raiſed upon the ſame ground in one year, taking
“ care always to have ſets from the repoſitory ready to put in as ſoon as
“ the others are taken up.” The author adds, That “ a crop of winter-
“ lettuce is ſometimes raiſed afterwards from the ſame land.” We are not ſanguine enough to imagine that this practice can be generally introduced with the ſame ſucceſs in every part of the kingdom: indeed the lateneſs of the ſeaſons in ſome parts, together with other untoward circumſtances, which neither ſkill nor induſtry can overcome, preclude all hopes of it.

But though we deſpair of ſeeing this done, we are enabled to ſay from experience, that two crops of potatoes may be obtained from the ſame ground yearly, with great eaſe, and afterwards a crop of coleworts or greens.

To raiſe two good Crops of Potatoes in one Year. The method that has from experience been found moſt ſucceſsful is, to plant the ground in the ſpring with the beſt early potatoe (managed in the way already quoted from the Lancaſhire Report); theſe will be ready in the beginning of ſummer: the ſoil ſhould then be ploughed once, and planted either with the large white kidney or Killimanca, the ſets of which ſhould be cut at leaſt ſix weeks or two months before they are planted: they ſhould be kept in a place where both air and light may have free acceſs to them, by which means their ſhoots will be ſtrong and vigorous; and as they will then have no froſts to encounter, they will grow immediately when they are put into the earth. The operation of planting ſhould be performed with the greateſt care, in order to preſerve the ſhoots from being broken, as in that caſe the crop will be rendered conſiderably later.

Perhaps there is no way of doing this ſo completely as with a ſtick: in this way the plant is not only placed at a proper depth, but the ſhoot is preſerved and ſet upright in ſuch a way, that the top is equal with the ſurface. It will certainly be objected to this mode of planting, that it requires more labour than the ordinary method of dropping the ſets into the furrow; but, when properly conſidered, this objection will vaniſh, as three people with dibbles will plant as many in one day as two perſons could do in the ordinary way.

If this compariſon as to the difference of expence is juſt, and we believe it is very near the truth, it will appear that dibbling requires only a third more labour than dropping the ſets into the furrow: to balance which the young tender ſhoots are preſerved, none of the plants are liable to be bruiſed by the horſes feet, and the work is regularly and accurately performed.

The reaſon for preferring the kidney or Killimanca for the ſecond corp is obvious: both of theſe are more productive than any of the early potatoes; and as the price at an advanced period of the ſeaſon is always conſiderably lower, any potatoe that will produce a greater bulk will be more profitable. There is, beſides, another reaſon of conſiderable weight; it is found from experience, that when ſucceſſive crops of potatoes are taken from the ſame land, the ſecond and ſucceeding crops are always more abundant when a different kind of potatoe is planted. This circumſtance is well worth the attention of farmers, as by a due obſervance of it they may plant potatoes for years upon the ſame ſoil, with profit to themſelves and without injury to the property.

A crop of this kind of potatoes will be ready to take up about the beginning or middle of October: indeed if the real kidney is planted, they will be ready in September, when ſufficient time will remain either for a crop of greens, coleworts, or a broad-caſt crop of turnips, to be eaten off in the ſpring with ſheep. Theſe are not matters of conjecture; the author of the preſent memoir had laſt year two very abundant crops of potatoes from a patch of ground in his garden, which was afterwards planted with coleworts, which were very large, before the winter ſet in. No manure was made uſe of for the firſt crop of potatoes, and only a ſmall quantity of new earth (part of the ſub-ſoil of the ſame garden) was given to the ſecond. It is worthy of remark, that the ſecond crop was not planted till the end of June; and though the ſeaſon was exceedingly dry throughout, the crop was very productive.

Method of planting Potatoes upon Lay. Potatoes are found to ſucceed beſt upon land that has been ſometime in graſs; and can be raiſed without any kind of manure upon lays of one or two years old.

The proper way of managing the lay ſeems to be that of ploughing it with a plough that takes off only the ſod, and lays it flat down into the furrow with the roots uppermoſt. The planter follows this plough, and places the ſets upon the inverted ſod; a common plough follows him, and covers them with the looſe ſoil. From the circumſtance of the ſod being completely inverted, it begins inſtantly to rot, and progreſſively as it decays it furniſhes a manure for the crop. When it is preferred to plant the ſets with a dibble, it can be done with great facility, the top of the furrow being a ſufficient direction for the planter to keep in a ſtraight line, and the compactneſs of the ſod below will prevent him from going too deep.

By the time that this crop is ready, the *turf* is in a great meaſure conſumed, and by mixing with the ſoil, will ſerve as manure for the ſecond. It will, however, be of great advantage if the ridges are accurately meaſured in ſuch a way as that the ſecond crop may be planted upon that part which formed the interſpace between the drills of the firſt. When this can be done (and with proper attention it may certainly be effected) two very important points will be anſwered thereby; the firſt advantage is, that the ſets will be put into that part of the ſoil which has been completely cleaned, and is no way exhauſted by the preceding crop; the ſecond is, that of affording an opportunity of extirpating the weeds upon that ſpace where the former crop grew, and which could not ſo readily be done during its growth. Where this plan is exactly followed, the weeds are completely deſtroyed, and no fallow can ever be required upon ſuch lands.

This plan of raiſing two crops in a year upon the ſame land applies ſtrictly to light free ſoils, ſuch as ſandy or gravelly lands, and the different kinds of loam. Theſe ſoils, from their want of capacity for retaining moiſture, will always be ſufficiently dry to allow the firſt crop to be put in early enough; but upon wet moſſy lands or ſtiff clays this cannot ſo readily be done, eſpecially the latter, which if the winter has been wet, is a conſiderable time before it can be laboured. There is ſtill another circumſtance againſt potatoes planted upon clays; which is, that they are for the moſt part watery, and very inferior in flavour to thoſe that are produced upon dry free ſoils. The only kinds upon which clay makes no difference, are the Yam and the different kinds of red potatoe. The taſte and other qualities of theſe are nearly the ſame upon all ſoils; but what gives them a decided preference for clay-lands, is the circumſtance of their growing to a larger ſize, and being more prolific than upon any other ſoil; to add to this advantage, they do not require to be planted very early, time is therefore allowed for working and reducing the land properly.

They may therefore be conſidered as one good ſubſtitute for fallows upon clay; at leaſt all clay-lands that have once been completely fallowed may afterwards be kept clean by uſing potatoe, cabbage, or bean crops. To do this effectually, however, more pains will be required than is uſually beſtowed upon drill crops. Very deep hand-hoeing, in addition to the ploughing will be requiſite, both to looſen the earth and deſtroy the weeds entirely: each of the labourers employed in hoeing ſhould carry at his belt an inſtrument about eighteen inches long, tipped with iron, with which he can very readily dig up any of the deep-ſeated weeds that are beyond the reach of the hoe or the plough; ſuch as the various kinds of docks, thiſtles, &c. which though the tops may be injured, or even cut off, will continue to live and put forth new ſtems, unleſs they are taken out by the root. An inſtrument that is uſed for taking up carrots, is alſo a good contrivance for digging up the long-rooted weeds.

We ranked moſs along with the clays, on account of the difficulty of making it dry enough for the reception of the ſeed early in the ſpring: this difficulty may, however, in ſome degree be got quit of, by laying it off into ridges of from ſix to twelve feet broad, digging a trench from twelve to eighteen inches deep, and the ſame width between each ridge, and throwing the earth upon the top. If this operation is performed before the winter commences, the trenches will carry off the water from the ridges, and render them quite dry in the ſpring, when a crop of early potatoes may be planted with ſafety; and the moſs that was thrown out of the trench being mellowed by the froſt, will crumble down and ſerve as manure. It is perfectly well aſcertained that excellent crops are raiſed in this way: indeed the Reports in poſſeſſion of the Board contain many inſtances of it; and what adds to the value of theſe crops is, their being perfectly wholeſome and free from the curl, and thereby furniſhing a change of healthy ſeed for lands where that diſeaſe prevails.

To perfect this crop very frequent hoeings and ploughings are neceſſary in the early part of the ſeaſon, not only for the purpoſe of deſtroying the weeds, but for looſening the ſoil, and allowing the roots to ſpread, and the young potatoes to ſwell. Great care, however, ſhould always be taken to have theſe operations over as early in the ſeaſon as poſſible, and the earth ploughed up to the roots before the dry weather ſets in, as nothing ſo effectually ruins a potatoe-crop as expoſing the roots to the action of the ſun and air.

Where only one crop of potatoes is intended to be taken during the ſeaſon upon clay-lands, a conſiderable profit may ariſe from dropping a bean between every ſet of the potatoes: ſeveral bolls per acre may be raiſed in this way, without the leaſt detriment to the potatoe, and without any expence except the ſmall quantity of ſeed.

Potatoes an excellent Crop for breaking up old Paſtures. This practice of planting potatoes upon the turf, on lays of one or two years old, is not confined ſolely to lands of that deſcription; it may be done with great advantage upon old paſtures when they are broke up. At preſent it is the cuſtom in many parts of England, to break up the beſt old paſtures by paring and burning: the reaſon given for this practice is, that the turf cannot be ſufficiently reduced without it. The general uſe of the practice of paring and burning is highly deſtructive to the ſoil, and inimical to permanent improvements.

In place of this practice, we would recommend to break up the ground in the way we have mentioned; that is, by paring off the turf, and inverting it with one plough, planting potatoes upon the turf thus inverted, and covering the ſets with another plough. In this way the turf would gradually rot, and, during that proceſs, would afford nouriſhment to the crop, no part of its uſeful qualities would be loſt, and when the ſoil comes to be afterwards ploughed for corn-crops, this turf would be completely reduced.

When old paſtures are broke up, the crop ſown is generally oats or wheat (the firſt is the moſt common): but if, inſtead of this practice, potatoes were planted the firſt year, and a crop of turnips ſown broad-caſt after they were taken up, to be eaten off with ſheep early in the ſpring, a better crop of oats would be obtained next ſeaſon, and the land would be in much better heart. The expence of paring and burning would not only be ſaved by this means, but every valuable principle contained in the ſoil would be preſerved and improved.

Anſwers well as a firſt Crop upon Commons or Waſte Lands, when they are brought under the Plough. Upon commons or waſte lands the ſame mode may be followed; which will ſave the expenſive and pernicious practice of paring and burning, than which nothing can be more deſtructive; and the poorer the ſoil, the more beneficial will its effects be.

There is hardly any deſcription of commons or waſte lands upon which potatoes may not be planted the firſt year, provided only that the ground is tolerably dry; and in caſes where it is wet, the lazy-bed method may be had recourſe to with ſucceſs.

Where potatoes are planted upon lands that are of a good quality, and have been long under tillage, they ſhould never be thought of but when ſuch lands require to be fallowed: in that caſe, a very good crop may be raiſed without manure, provided the ſoil is not very thin and light. It is by no means uncommon for the inhabitants of large towns and villages to give five or ſix guineas per acre to the farmers in their immediate vicinity, for lands of this deſcription, which they plant with potatoes: the farmer being at the trouble of ploughing the land, and the perſon who rents it paying the expence of ſeed, and all the ſubſequent operations.

Crops raiſed in this way are in general very productive; and from the ſame perſons continuing to take land every year for this purpoſe at ſo high a rent, and furniſhing labour beſides, it is evident that they muſt find it profitable.

The ordinary operations for crops raiſed upon the beſt lands, are two or three hoeings and two ploughings. In the firſt ploughing the earth is taken away from the roots, and laid up into a ridge in the middle of the interſpace: in the ſecond, a deep furrow is taken in the middle of the ſpace between the drills; which completely lays the earth up to the roots of the potatoes; after which no farther operation is neceſſary till the crop is ripe, except picking up by the hand any weeds that may be growing in the drill, and which may have made their appearance after the hoeing and ploughing are over.

Quere II. "What is the beſt manure for potatoes, the quantity neceſſary per acre, and its price or value?"

We have already ſaid that, in many caſes, good crops of potatoes may be raiſed without the aſſiſtance of manure, eſpecially upon new lands. We by no means wiſh it to be underſtood, however, that this can be done upon lands of every deſcription, or that it can be done for any length of time even upon the beſt lands, without injury to the ſoil.

A ſucceſſion of corn-crops without manure, will exhauſt the richeſt ſoil: a ſucceſſion of potatoe-crops will do the ſame. There is, however, a diſtinction to be made in this buſineſs that is highly deſerving of notice; which is, that lands that are exhauſted by carrying corn-crops, will, without any manure, carry very bulky and valuable crops of potatoes. Lands, again, that have carried ſeveral crops of the latter, will, without any manure, carry good crops of grain. From this circumſtance it appears that the ſame kind of food is not neceſſary for both; and that though the ſoil may be very much exhauſted of the principles neceſſary to nouriſh and bring to maturity a crop of grain, it may nevertheleſs contain abundance of theſe that are neceſſary for rearing and perfecting a crop of potatoes, and *vice verſa*.

It is of importance that this circumſtance ſhould be generally known, as many thouſand acres of land are fallowed yearly, from a thorough conviction on the part of the farmer that they are exhauſted as well as dirty; which might be completely cleaned, and at the ſame time produce an abundant crop of potatoes.

The falſe and ill founded idea of land requiring reſt, will no doubt operate upon the mind of many farmers in ſuch a manner, as to make them give a decided preference to fallowing:—though land may be cleaned by fallowing, it is no way renovated. This laſt object of reſting and renovation is more completely obtained by laying it into paſture; and as a potatoe-crop is well calculated for cleaning land, it may afterwards be laid down to graſs with much advantage.

The manures that have been found beſt for potatoes are the following:

1. Stable Dung.
2. Moſs
3. Turf,
4. New Earth.
5. Lime.

1. Stable Dung.

With regard to the firſt of theſe, viz. ſtable dung, when it is uſed upon ſandy or gravelly ſoils, it ſhould be completely fermented; and if accurately laid into drills above the potatoes, will produce a good effect. Upon clays, however, or tills, what is called long or rank dung will be much more beneficial; not that its nutritive qualities are greater when it is in that ſtate (on the contrary, they are leſs) but it has one good effect in clay-ſoils, viz. that of keeping the ground open, and thereby allowing room for the roots to ſpread and ſwell in every direction.

This idea is ſo far improved upon in ſome ſituations, that broom and furze, and even wheat-ſtraw, are put into the drills by way of manure. The uſe of them is certainly attended with conſiderable advantage; but their effect is completely miſunderſtood; for in place of ſuppoſing that their greateſt benefit depends upon their keeping the ſoil free and open, which is certainly the fact, it is ridiculouſly imagined that they act as manure. We by no means diſpute that furze or broom, when completely rotted, may be converted into manures, but we are perfectly convinced that their benefit in this caſe will be more completely experienced upon the crop that follows the potatoes; as by that time they will be decayed, and mixed with the ſoil.

2 and 3. Moſs and Turf.

Upon the ſame principle that long or rank dung is valuable as a manure for potatoes, moſs is equally ſo. Upon light ſoils it will produce good effects, both by enabling the potatoes to reſiſt the drought, and by affording them an excellent nouriſhment. Upon ſtrong clays or tills, its effects will be ſimilar to rank dung; namely, that of keeping the ſoil open, and allowing the roots to ſpread and ſwell *freely*.

The uſe of moſs in this caſe will be an advantage not only to the preſent, but to the ſucceeding crops. Upon light thin ſoils it will be a conſiderable addition to the ſtaple of the land; and if the ſubſtratum is chalk or limeſtone, ſo much the better, as it will correct its alkaleſcent quality, and render it more retentive of moiſture; by which means it will bear drought better. Upon clay ſoils, again, it will break their coheſion, and afford a free paſſage to the water through them: by this means they will be mellowed down, will be much eaſier laboured, and will be brought in a great meaſure into the condition of loam. Turf is included in this article.

4. New Earth or Soil, a Manure for Potatoes.

We have already obſerved that the greateſt crops of potatoes are raiſed upon new ſoils ; preſuming from this circumſtance, that the uſe of new earth laid into the drills, would act as a manure. The author of this paper made a trial of it laſt year upon a crop of potatoes planted about the end of June, on a ſpot of ground from which a crop of the early kind had juſt been ſeparated. One of the drills of this late crop was planted without any of the new earth; the effect was very viſible ; that where the earth was applied, yielding a luxuriant good crop, nearly double of what was obtained from the drills, where none of it was uſed. The ſoil made uſe of in this experiment, was the ſub-ſoil of a part of the ſame garden ; which was taken out in the following manner : A trench was dug of eighteen inches deep, and the ſame width. Into this trench the firſt ſpading of the earth was thrown, and the next ſpade-depth of the ſub-ſoil taken out and carried away. In this way the ſurface remains unaltered, and the ground is equally valuable as it was before the removal of the earth : beſides, this earth can be reſtored at a future period from the field to which it has been carried, by taking away a part of the ſub-ſoil from it in the ſame manner.

It is worthy of remark, that the practice of taking out the ſub-ſoil may be followed with the ſame ſucceſs for any other crop, as well as potatoes.

5. Lime as a Manure for Potatoes.

Lime is frequently employed as a manure for potatoes, and, to appearance, with conſiderable ſucceſs, eſpecially upon new lands or deep heavy loams that have been long under tillage. From ſome obſervations which we have lately made, we are however diſpoſed to think lime an improper manure. The circumſtances which gave riſe to this opinion are as follow :

A piece of ground (deep loam) was well manured with lime and planted with potatoes : when their plants appeared above ground, near three-fourths of them were curled, while at the ſame time a few drills immediately adjoining, which had got no lime upon the ſoil, and planted with the ſame ſeed, were entirely free from the diſtemper. This circumſtance attracted notice ; and the ſame experiment was repeated next year, with the ſame reſult. Since that time, the author of the preſent memoir has paid particular attention to thoſe ſituations in which the curl is moſt frequent ; and he has uniformly found it to prevail moſt in the diſtricts where much lime or aſh-dung is uſed. He has alſo obſerved, that in thoſe parts where the lime-huſbandry is but partially practiſed, ſuch as the hills and uplands, ſcarce any ſuch thing as the curl is known. There is one circumſtance in theſe upland ſituations that may operate as a preventive of this diſeaſe; that is, the nature of the ſoil, which is for the moſt part moſſy. This idea gains conſiderable ſtrength, from obſerving the practice of the Lancaſhire planters; ſome of whom ſend their favourite kinds to the moſſy grounds to recover, after they have caught the diſtemper.

The Author of the Eaſt Lothian Survey, who in the courſe of that work has diſplayed much *learning* and *ingenuity*, takes notice of the circumſtance of potatoes not being ſubject to the curl in the hilly and high grounds. His expreſſion is (for we uſe his own words) "It is ſomewhat "ſingular that this diſtemper (the curl) is unknown in the higher diſtrict "of the country, at an altitude of 400 feet above the level of the ſea." He goes on to reaſon upon the probable cauſe of this difference, and ſeems to aſcribe it to the froſt ſetting in early in the ſeaſon in theſe elevated ſituations, and deſtroying the *baulm* of *the* potatoe before it is completely ripe. The inference he draws from them is certainly a wrong one; for he ſeems to imagine that, in order to raiſe the beſt ſeed-potatoes, they ought to be taken up before they are ripe. Experience, however, contradicts this theory; for it is found that the more completely the bulbs or ſeeds of any plant are matured, the more perfect and productive will they be when they are put into the earth as ſeed.

It is evident that the Author has aſcribed that to altitude which is owing entirely to the nature of the ſoil, as it is now known that in even the loweſt ſituations, potatoes do not curl upon moſſy ſoils; while, on the contrary, the curl has lately begun to appear even in the moſt elevated ſituations, where the lands are in good heart, and have been much manured with lime, coal, or wood-aſhes.

From theſe circumſtances, it would appear that ſoils which contain a moderate degree of acidity are unfavourable to the curl in potatoes; and that in every ſituation where there is much calcarious earth or alkaline matter in the ſoil, the diſeaſe is more frequent.

At the ſame time that we are diſpoſed to think that lime in its ſimple ſtate has a tendency to produce the curl in potatoes, we entertain a very different opinion of it when made into a compoſt with earth and dung. If the compoſt has been well mixed, and the quantity of lime not too great, the active qualities of the lime will be exerted upon the ſubſtances with which it is mixed: when employed in this way it will be found a good manure, and, in nine caſes out of ten, no curl will appear.

It ought therefore to be laid down as a rule, That where lime is uſed for potatoe-crops, it ſhould always be previouſly mixed into a compoſt with earth, dung, or ſome of the putreſcent manures. In this way it will afford a valuable nouriſhment for the crop, and every inconvenience attending its uſe will be avoided.

The Quantity of Manure and its Price.

The quantity of manure neceſſary for a potatoe-crop, differs according to the nature of the ſoil and other circumſtances. Where ſtable-dung is uſed upon ſandy or gravelly ſoils (and we are of opinion it ſhould be employed upon no other) the quantity is generally about thirty loads per acre: in ſome caſes, however, forty loads are laid on; which, at 2s. per load, is 4l.

Where furze, broom, ſtraw, or brown moſs (vulgarly called fog) are made uſe of as manures, it ſhould only be upon ſtiff clays. Their value upon ſuch lands (as we have already noticed) depends more upon their keeping the ground open than upon any enriching quality they poſſeſs. Where the clay is ſtiff, the quantity made uſe of will require to be very conſiderable. In general, however, an acre may be done with furze, broom, or brown moſs, for about 10s. where theſe articles can be eaſily got. Heath may alſo be ſucceſsfully employed for the ſame purpoſe. But where rank ſtable-dung or wheat-ſtraw are uſed, the expence will run from 40s. to 3l. per acre. The uſe of either wheat-ſtraw or long dung we reprobate, as clay lands will receive the ſame (perhaps a greater) benefit from furze, broom, heath, peat-moſs, or fog. When ſtable-dung is put into the earth in an unfermented ſtate, it does little more than keep the ſoil open; and though it may decay when ſo applied, the ſucceeding crops will be very little benefited thereby. Wheat-ſtraw is ſtill worſe; as the utmoſt benefit the ſoil derives from it is the addition of a ſmall quantity of vegetable earth.

Beſides, the uſe of theſe ſhrubby plants will have one ſingular advantage, which can hardly be expected from any other contrivance; that is, the drills will act as a kind of drains for carrying off the water, and by that means render the field drier; which, where potatoe-crops are planted upon clay lands, is a very important conſideration.

In ſpeaking of the improvement of waſte lands, eſpecially ſuch as are covered with furze, heath, &c. and where either the ſurface or ſub-ſoil is clay, we may take notice of the utility of drains made with theſe ſhrubs: at preſent we confine our obſervations, as to their utility, ſolely to the cultivation of potatoes; and upon that ſubject we truſt the hints thrown out will not be deemed altogether uſeleſs.

QUERE III. "What is the average produce per acre and average price?"

The average produce of a potatoe-crop differs according to the kinds that are planted. Where the Dwarf Round Early is raiſed, from twenty-five to thirty bolls per acre is reckoned a good crop. Theſe generally ſell from 4s. to 10d. per peck.

Where the Early Kidney is planted, the crop is ſometimes from thirty-five to forty-five bolls per acre: the price of theſe (being ſomewhat later than the Round Early) is from 3s. to 8d. per peck.

Where the Royal or Cumberland Early is planted, which grows to a conſiderable ſize, and is at the ſame time very prolific, the crop may average ſixty or ſeventy bolls per acre. Theſe will alſo ſell at from 3s. to 8d. per peck.

Of all the late kinds the produce is much greater; ſixty bolls per acre is an extraordinary crop; and upon good lands, ſeventy, eighty, or 100 bolls are often reaped. The price of theſe differs from 7d. to 3 ½d per peck.

Taking the prices one year with another, perhaps not more than one-eighth of any kind of potatoes ſell at the higheſt prices; but even upon this calculation, which is moderate enough, it will appear that the ſum drawn for an acre will be very great.

Where one crop only is raiſed upon the ſame ground yearly, the average value of an acre may be from 12l. to 16l. or to 18l. per acre; and where two crops are raiſed, the value may run from 16l. to 25l. ſterling per acre.

QUERE IV. "Whether ſucceſſive crops of potatoes can be raiſed on "the ſame ground without exhauſting it?"

This queſtion has been in a great meaſure anſwered in the preceding part of this memoir. Every experience that we have had convinces us, that a ſucceſſion of any kind of crops will exhauſt land, unleſs a conſiderable quantity of manure is thrown in. We have obſerved, however, and we are completely warranted in the obſervation, that though a ſucceſſion of crops of the ſame kind of potatoes will not be profitable, yet if a different kind is planted each time upon the ſame ſoil, they will be good. We leave it to thoſe who are converſant in ſuch matters, to account for this difference; it is ſufficient for us to ſtate the fact; which upon trial will be found juſt.

Directions with regard to Seed, Preſervation through the Winter, &c.

Perhaps the ſame ſeed ought never to be planted twice upon the ſame land; at leaſt from obſervations that have been made, it is found that the oftener ſeed is changed, the crop is more productive, and leſs liable to curl.

With regard to the mode of preſerving them through the winter, it depends upon two circumſtances; firſt that of laying up the potatoes dry; and ſecondly, that of preſerving them from the winter froſts. Where they have been laid up perfectly dry, there is no very great danger of their being hurt by ordinary winter froſts; but to provide againſt the worſt, they ſhould always be completely covered, either with dry ſand to the thickneſs of ſix inches at leaſt, or with ſtraw, fog, or the leaves of trees; any of which, if they are perfectly dry, and the potatoes covered with them early in the ſeaſon, will be ſufficient for excluding the froſt.

No. VII.

To the Preſident of the Board.

SIR,

THERE is no vegetable of greater uſe and advantage, particularly in this part of the country, than the potatoe. It is not only of great profit to the induſtrious farmer, but likewiſe compoſes the principal food upon which the lower claſſes of life ſubſiſt. Any improvement that can be diſcovered in the cultivation of it, ought therefore to be regarded, and publicly made known. From theſe motives, I am induced to lay before you ſome experiments which I have made upon the planting of the ſprits or ſhoots of potatoes, and for preventing the potatoe from becoming curled.

Much of late having been ſaid upon the advantage accruing from the planting of the ſhoots of the potatoe, I was determined laſt ſpring to give it a fair trial. I took from ſome of my earlieſt potatoes all the ſhoots which they had made; carefully ſelecting thoſe which were remarkably long from thoſe which had ſprit not more than three inches in length from the eye of the potatoe. The long ſhoots I cut into diſtinct pieces, about the length of four inches each. About the latter end of March, I planted them in trenches, about a ſpade deep and a ſpade wide; ſome in an horizontal, others in a perpendicular poſition: it was in a well manured, light ſandy ſoil. They were covered with mould about three inches deep. In a few weeks they made their appearance above the ground. Thoſe ſhoots which were not more than three inches in length when I took them from the potatoe, appeared healthy, ſtrong, and vigorous; but thoſe which, from their length, I was under the neceſſity of curtailing, wore a ſickly unpromiſing aſpect, only ſending forth one weak ſlender haulm. The firſt has produced as good a crop as my moſt ſanguine hopes could expect: it is not exceeded by any in this neighbourhood; but the latter has produced ſcarcely any fruit. I have only been able to raiſe one potatoe from a root; and indeed, for the moſt part, none at all. The ſets from which I took the ſhoots were likewiſe planted; and in comparing them with others of the ſame ſort, which were not deprived of any of their ſhoots, I do not find the crop in any degree inferior: there appeared not the leaſt diminution of their vegetative power. I found that it was of no conſequence in what poſition the ſhoots were planted, whether horizontal or perpendicular: both ways anſwered extremely well.

As to the cauſe of the diſorder of curled leaves in potatoes, many and various opinions have been entertained. Perhaps the circumſtance I am about to ſtate, may throw ſome light or information upon it.

I have been in the poſſeſſion for theſe eight years of a very forward productive potatoe, which from their ſhape we call Mice. Not a ſingle ſet belonging to this potatoe was ever known to produce a criſped curled leaf before this ſeaſon: and the cauſe of it I attribute to the following circumſtance:

About the beginning of October I took them out of the ground, and, according to my old cuſtom, put them upon ſome ſtraw in a vault in the cellar, and covered them with it on the top; where they were left for the winter. It was impoſſible for froſt to approach them. In February laſt a friend requeſted me for a few of them to plant. Accordingly, about a buſhel were taken from the ſtore, and put in an out-houſe in the yard; where they remained ſometime, during which there were ſeveral ſevere froſts. I eaſily perceived that the froſt had affected them; and was therefore determined to try what effect it had upon them. They were planted; and the conſequence was, that one half of them had curled leaves, and was not half a crop. Thoſe which remained in the vault until they were planted, were not *in the leaſt* diſordered. I doubt not but that there are many other cauſes which may produce this diſorder; but the foregoing experiment clearly demonſtrates *that the froſt will cauſe that diſorder*, and therefore ought with all carefulneſs to be avoided.

I hope my intentions will plead a ſufficient excuſe for the liberty I have taken in troubling you with this haſty ſketch. If it can prove in the ſmalleſt degree ſerviceable, my higheſt wiſhes will be accompliſhed.

I am,

HONOURABLE SIR,

Your moſt humble and moſt obedient ſervant,

Warrington, Lancaſhire,
10th Auguſt, 1794.

W. WOODCOCK.

No. VIII.

Hints by Mr. Holt of Walton.

THE varieties of potatoes are almoſt endleſs, new kinds being raiſed every year from ſeed; but there is one remarkable property attending the new raiſed kinds, viz. That for a few years after being raiſed from the ſeed they do not uſually bloſſom. After ſome time (which depends upon the quality of the potatoe) they put forth flowers which produce fruit, from which the ſeed is collected; and all the varieties of the potatoe are raiſed from ſeeds thus collected *(a)*. This property ſeems to hint the neceſſity of frequently raiſing potatoes from ſeed; for if continued too long, they become liable to diſeaſe (ſuch as the curl, &c.)and produce but a little crop: change of land will however prevent *this* for many years; for which reaſon the ſame plants are ſeldom uſed upon the ſame ſort of land more than twice, or three times at the fartheſt. If there ever appears the leaſt ſymptom of diſeaſe, the ſets are diſcarded, and freſh ones procured from potatoes that have been planted upon a different ſoil; *e. g.* from barren to rich, from clay to ſand-lands (*b*). The coarſer the potatoe, the leſs liable to diſeaſe; it will ſtand longer upon the ſame lands without change, and without renewing the ſeed. The *Manly* and *Pink-Eye* are both delicate potatoes, and of excellent

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(a) The *Champion* potatoe being ſent into the ſouth, puts forth bloſſoms ſome years earlier than the ſtock from which it deſcended did in Lancaſhire.

(b) Sets from moſs-lands are in high eſteem, particularly for dry ſandy ground.

qualities, farinaceous and mealy; but were ſo affected with the curl ſome years ago, as to be totally given up till renewed again from ſeed (*c*). They are at preſent in great eſtimation.

Beſides the Manly, which ſucceeds the Early Dwarf, there is the Early *Champion* (but much coarſer) and *Perrins*, varieties of *Kidneys*, *Golden Dun*, and *Golden Dun Kidneys*, the *Pink-Eye* and *Pink-Eye Kidney*, and (not the leaſt valuable) the Winter Red, the beſt flavoured potatoe in the ſpring and after the other kinds grow ſtrong, and continues good till July (*d*). Ox-Nobles, Champion, Apple (*e*), and Cluſters, for the uſe of cattle.

The greateſt quantity of potatoes may be raiſed from the ſame land by *digging* with a ſpade; but where great tracts are planted, the ſpade is inſufficient; labourers are not to be procured in ſufficient numbers. It may not be amiſs to deſcribe the proceſs of digging with the ſpade, and planting the potatoe upon lands thus prepared.

Early kinds are uſually dug for in gardens, or looſe earth land already in tillage. A trench is made one foot wide at leaſt, the dung laid in, then covered with ſoil about four inches thick; the potatoes are planted with a dibble after being cut into ſets. The butts are beſt about four feet broad; and a rib of earth ſhould be left in every furrow (in Lancaſhire called Raine Quere Drain) (*f*) or the ſpace between each butt of about one foot at leaſt in breadth. This ſoil is to be thrown over the potatoe as ſoon as it begins to appear above ground, with a ſpade. This operation not only checks the weed then beginning to appear, but wonderfully refreſhes the potatoe-plant (*g*). The drill-plough (hereafter to be deſcribed) if run through this rib of earth once or twice previous to the operation of throwing upon the butts with a ſpade, will tend greatly to pulverize and ameliorate the ſoil. If the land be ſward and clean, the proceſs is the ſame; only the ſward is taken off firſt and buried under the dung (*b*). This method is practiſed by the cottager with ſucceſs upon his little plot; and may be uſeful in the corners of fields where the plough could not be uſed.

(*c*) Not that the ſame ſpecies will always be raiſed from ſeed ſimilar to the plant from whence gathered; for one ounce of ſeed may produce one hundred varieties, and probably not two out of the whole worth cultivation; but a ſimilar plant *may be produced* from the parent ſtock. Upon this ſyſtem the diſeaſe called the Curl, has been effectually prevented for ſome years in Lancaſhire.

(*d*) And yet a very indifferent potatoe in flavour till its proper ſeaſon.

(*e*) A potatoe ſo called, but not ſo productive as the Ox-Noble. Perrins are ſaid to be ſuperior to the Ox-Noble in produce. All theſe improve by cultivation, in flavour, grain, and mealineſs.

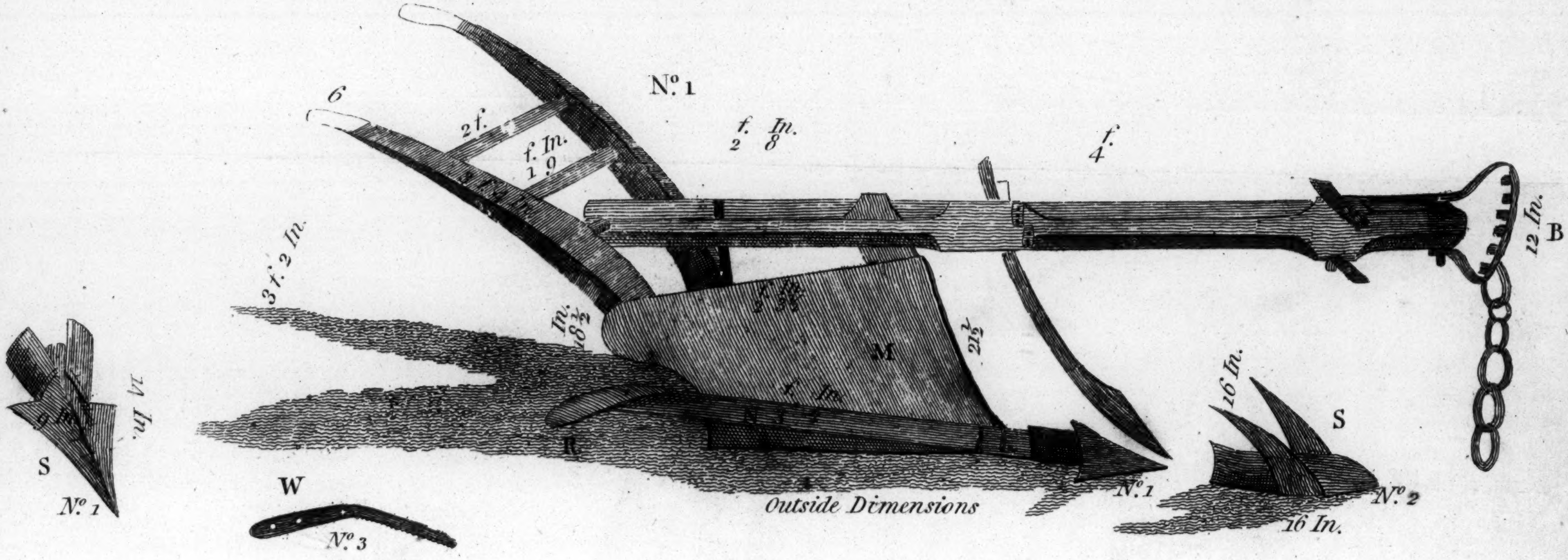
(*f*) The provincial pronunciation is Ree-an.

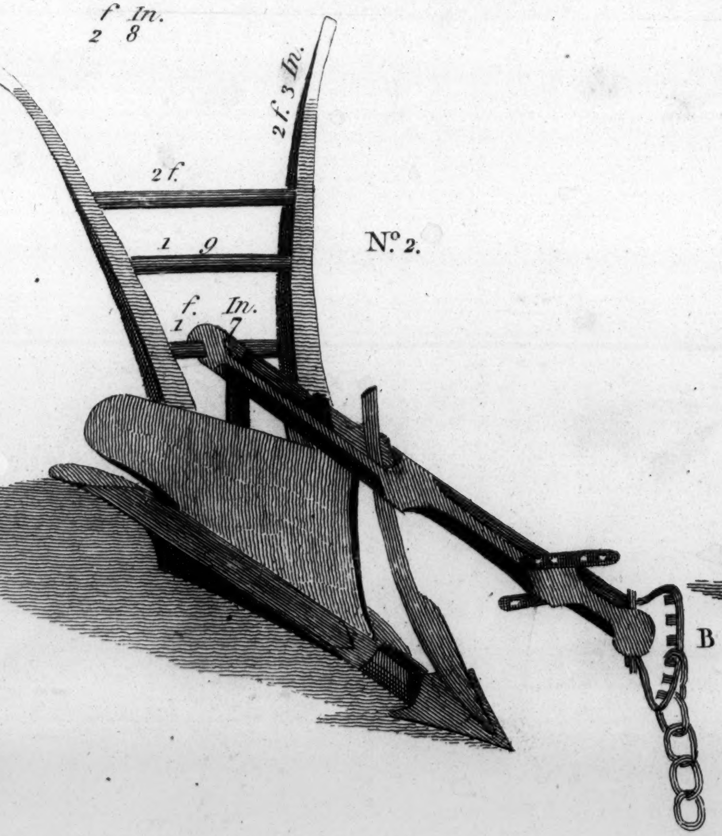
(*g*) Land is frequently ploughed drawn out into butts of this breadth, the dung ſpread over the ground and turned under by the plough, then planted by a dibble, a ridge of earth being left to throw over, as deſcribed in the text; and this method is found to anſwer well.

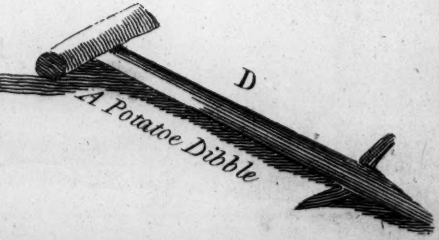
(*h*) Where it will admit of it, the land is ſometimes previouſly ſkimmed by the plough.

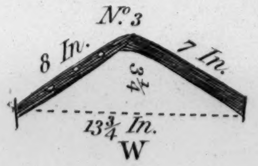
BL

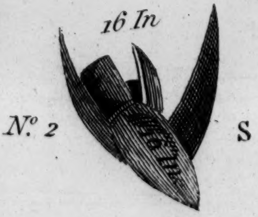
Two views of Mr. Henry Hooper's new invented, double mold Drill Ploughs, with Dimensions of each seperate part.











To Face P. 161.

Neele sculp. 352 Strand

Lazy-beds are entirely diſuſed (being properly ſo called) and only practiſed by the moſt indolent.

Drilling with the common plough in trenches of three feet and four furrows, is already ſufficiently deſcribed in the Lancaſhire Report.

In lands which are tolerably clean, drills of two feet in breadth are found to be ſufficient; as experienced laſt year by Mr. Henry Harper, and with the advantage of his new invented drill-plough. The land ſhould be previouſly, winter and ſpring, fallowed by laying the land in one-bout ridges (as the drill-ploughs two furrows at once); then in the ſpring preparing the ground by dividing thoſe drills, harrowing, &c. till prepared ready for planting at the proper ſeaſon, according to the different kinds.

When a drill is made by this plough, by throwing the earth (*i*) each way, the dung then is laid at the bottom of this drill; upon which the potatoe is afterwards laid. Then the plough is ſet to work again, and turns the two earths thrown out back again; covering one half of two drills every time it goes along the land. Mr. Harper thinks the diſtance of ſeven inches in the rows better than ten, becauſe this diſtance with two foot-drills, will cauſe a greater quantity of potatoes to be raiſed from the ſame ground, and the dung more equally diſtributed. The potatoes are hoed by the drill-plough with a ſhare (*k*) (No. II.) which has wings, and carries away moſt of the weeds: if any remain, a hand-hoe may be neceſſary.

In hoeing and cleaning the potatoes (*l*), if very foul, a common light plough may be uſed to turn a narrow furrow from the potatoe-drill; which muſt be ſucceeded by the drill-plough; and which, by the aſſiſtance of the two *reeſts* or wriſts (*m*), the ſoil may be thrown up to the very top of the drills and ſtems of the plant: if not ſo full of weeds, the drill-plough alone will be ſufficient, with the *reeſts* taken off: the ſhare may be made narrower or wider as neceſſity requires; and the weeds will fall to the bottom of the drill and there periſh, if the winged ſhare only be uſed.

The method of cutting the potatoe into ſets has already been ſufficiently

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(*i*) There ſeems a great want of appropriate and preciſe terms: it would be a good thing if a new vocabulary was adopted (and who ſo proper as your Secretary?). In Lancaſhire the place from whence the earth is removed and the earth itſelf, are both diſtinguiſhed by the name of Furrow.

(*k*) Again we are at a loſs for a proper word. The Engliſh Cyclopedia calls it *ſhare*; Dictionary of Arts and Sciences, *ſhet*; Scotch Cyclopedia, *Sock*; Lancaſhire, *ſuck*. —*Sock* ſeems an appropriate term enough.

(*l*) Potatoes to produce a crop, muſt be carefully weeded either by the plough or hand-hoe: if the weeds are permitted to flouriſh, no crop, under whatever management, can ſucceed.

(*m*) *Reeſt* or *wriſt*. Another puzzling word, not to be found in any book I have at hand. The addition of this part to the plough may be peculiar to Lancaſhire; of courſe the word. Its pronunciation is Reeſt.

explained in the Lancaſhire Report; but to render which, if poſſible, more intelligible, drawings are herewith ſent of the potatoe, marked out previous to diſſection; and afterwards ſections of ſets. Some may object to the great waſte of only making one ſingle ſet out of one potatoe; but of what conſideration is a ſmall addition of ſeed to an abundant crop thereby gained

Taking the potatoe up, according to the uſual proceſs, is a tedious and expenſive piece of buſineſs, and cold work, eſpecially in wet ſeaſons. In the autumn of 1794, the weather was very unfavourable; many potatoes periſhed before they were taken out of the ground: both men and women were frequently ſeen at work upon wet lands ancle-deep. Schemes have been deviſed to facilitate and expedite this work; amongſt which the following implement, made nearly in the form of a plough with three ſtrong iron prongs fixed to it, which works through the centers of the drills where the potatoes grow; but this inſtrument requires three horſes to draw it, a holder to direct it, a driver of the horſes, and another perſon to clear away the weeds and ſtems of the potatoes, which would otherwiſe continually choak the inſtrument, and retard its progreſs; and after this proceſs, many potatoes would yet remain in the ground, and uncovered with earth.

Mr. Harper's drill-plough has performed this work in a ſtyle much better than the above-noticed inſtrument, in the following manner: The culter muſt be removed, and the ſmaller ſhare only applied. The *toothed wing*, or *dray-boy* (*n*), muſt be fixed on the right ſide of the end of the beam, ſo that the horſe may go up the interval betwixt the drills, and the plough up the very center of the drills, with the ſhare under the growing potatoes; by which the drill is ſplit in the middle, a furrow thrown each way, and the principal part of the potatoes laid bare. This operation muſt be followed by gatherers with baſkets, and cleaners with a three-pronged fork, to lay bare what may yet remain, and to collect the weeds and ſtems into heaps.

No more ſhould be uncovered than what can nearly be collected, leſt rain or froſt ſhould happen. One horſe is ſufficient for this work, with a man to hold the plough; but without a driver. Upon a calculation made of the work done in a certain ſpace of time, the expence of horſe, ploughman, gatherers, &c. compared with the uſual proceſs of taking up by the three-pronged fork, there appeared a ſaving in favour of the plough of not leſs than one fourth.

The manner of depoſiting the potatoe in repoſitories during the winter ſeaſon, has already been deſcribed in the Lancaſhire Report, and again in

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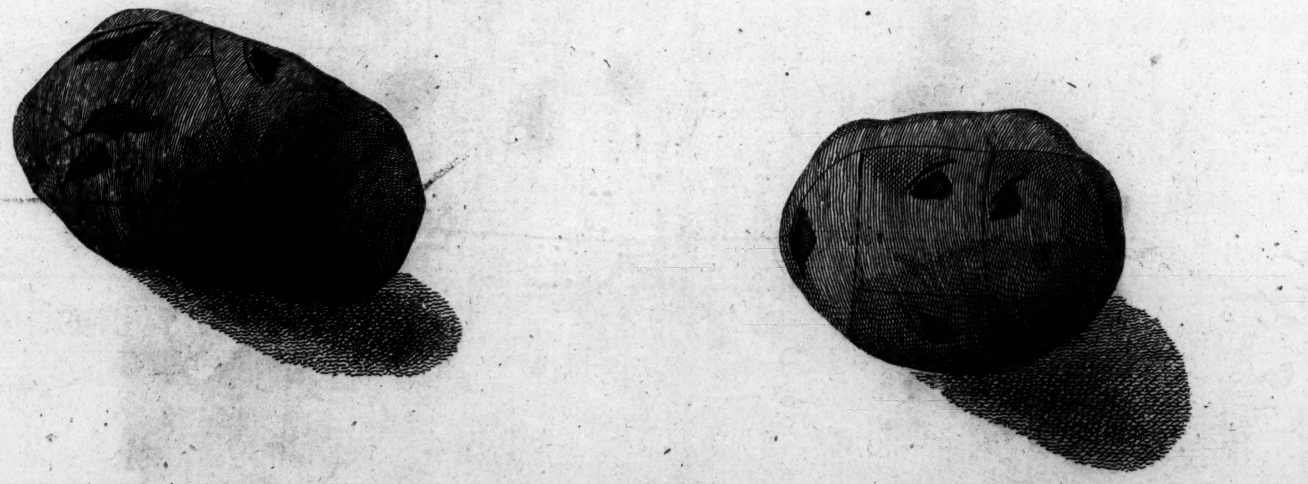
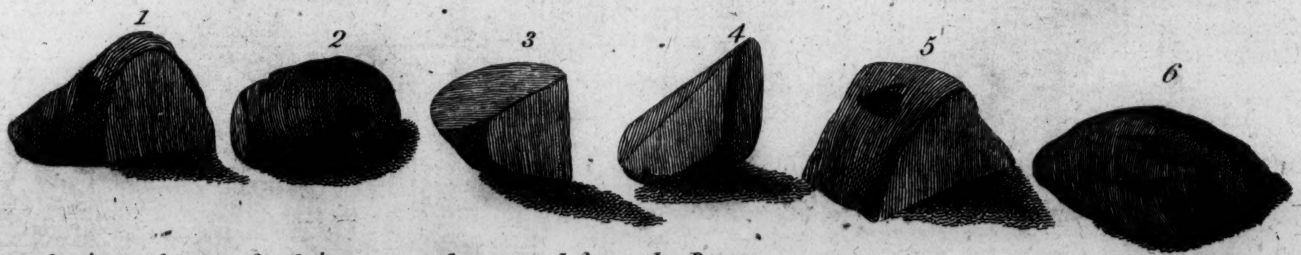
(*n*) Here again is a puzzling word: in the Scotch Cyclopedia it is called *muzzle*; in the Engliſh, does not ſeem noticed; in Lancaſhire, the provincial word is *buck*: a kind of cat-head, to alter the line of draught to take more or leſs land.

Potatoes marked out by Lines, how dissected to have a single Bud or Eye in each sett, previous to Dissection



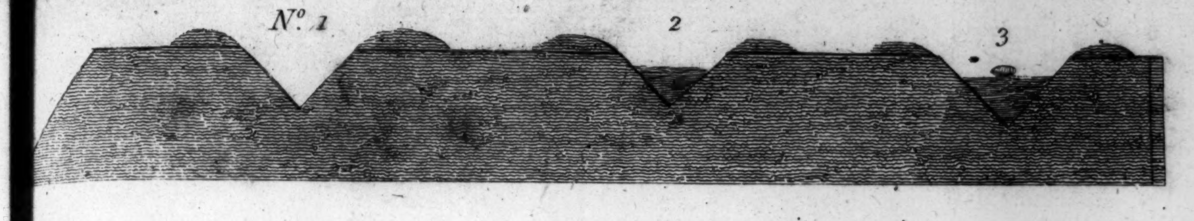


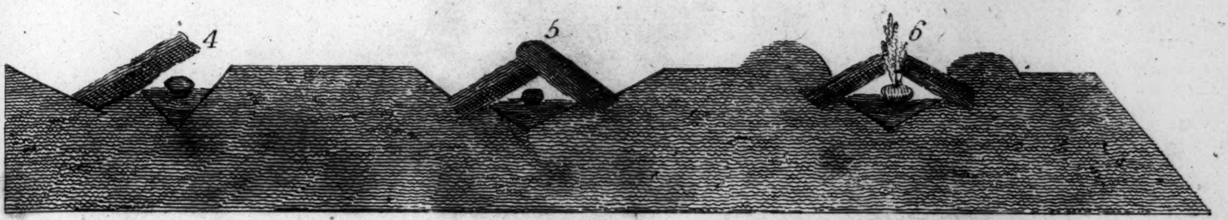
Sections of Setts, after being cut and seperated from the Potatoe.

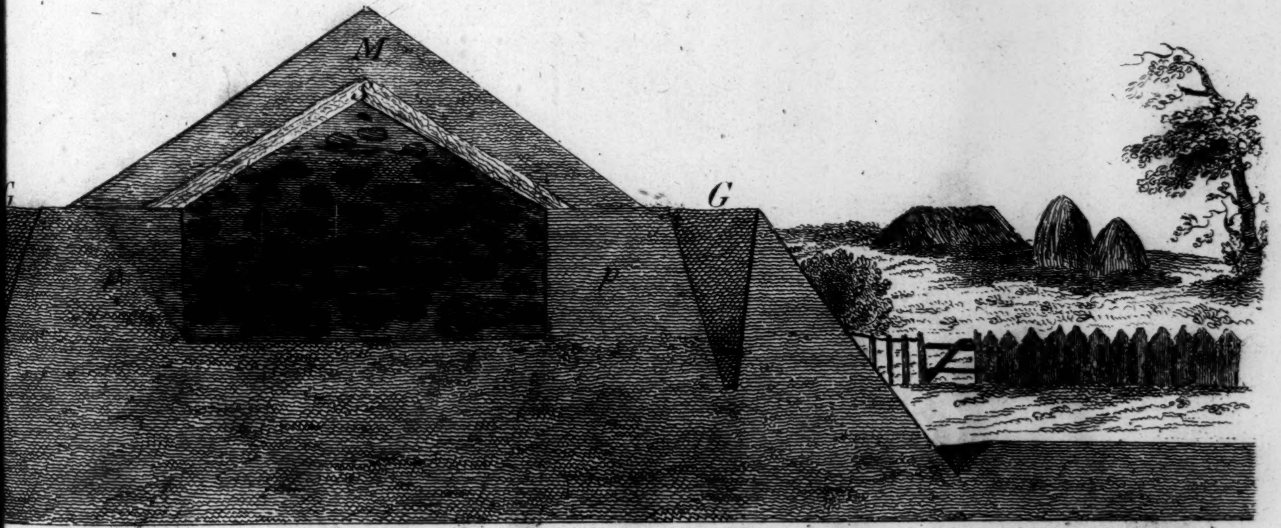
See P. 162.

Neele Sculp.t 352, Strand

B L







N°1 – is a Furrow opened for the reception of the Dung, by thrusting the earth each way. N° 2 the same Drill, with Dung only laid in. N° 3 – exhibits a Potatoe laid upon the Dung. N° 4 – a Furrow of earth hrown upon the Potatoe &c. N° 5 – Two Furrows of earth, the Potatoe covered, and one Drill completed. N° 6 – exhibits part of the earth thrown off each side of the Drill, when the Potatoes begin to appear; and which, fter lying the space of a few Days and till the Weeds be withered, is then thrown back again.

Drawing of a Potatoe Repository p.p. – Potatoes over which is a covering of Straw S. upon which is a layer f Mould two Feet thick, M. – G.G. a Gutter round the whole.

Neele sculp.t 352 Strand.

See P. 162.

B L

the paper iſſued by the Board. It may not be amiſs to add, that the gutter (*o*) round the repoſitory, ſhould be at leaſt ſix inches lower than the potatoes; that the nothern or eaſtern ſides require a deeper cover of mould than the ſouthern or weſtern. *Safe bind ſafe find* ſtill holds good. A ſingle hour of additional labour in covering, may prove the ſafety of a whole ſtock. The ſurveyor opened a repoſitory the 25th Feb. 1795, and the froſt had penetrated through a thickneſs of covering of mould not leſs than two feet: the ſtraw underneath had preſerved the potatoes from deſtruction. Litter from the ſtable, to cover the whole ſurface, is a good preventive when froſt appears. It is of no ſmall conſequence to be aſſured that potatoes may be preſerved without the trouble of drying; which is not only tedious but expenſive, and ſometimes very inconvenient for want of covered buildings. The following mode has been adopted by Mr. Henry Harper with ſucceſs: Be the potatoes in ever ſo wet a ſtate, and immediately after being taken up, and which is only by making the repoſitory narrower (three feet broad only) and covering the potatoes with a double portion of ſtraw. The ſame proceſs in other reſpects as before noticed. Mr. Harper aſſerts the quality of the potatoes improved by this method.

Upon this principle, hay-ſtacks are ſometimes made; and hay in any quantity, and in a greener ſtate, will keep with more ſecurity thus than by any other mode. If the ſtack be narrow enough, it may be continued to any length. The ſame will hold good with corn.

Walton, March 4, 1795. JOHN HOLT.

No. IX.

Dr. De Salis to Dr. Pearſon.

MY DEAR SIR,

I HAVE learned unexpectedly ſomething relating to the *ſuperficial* potatoes, of which I wrote to you, from a ſervant of mine, the ſon of a

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(*o*) The gutter is formed by the ſoil taken out, which forms the cover, and ſhould be as cloſe to the heaps as may be, ſo that the earth does not fall into the trench with the weight of the potatoes. No hole ſhould be dug, but lay the potatoes even with the ſurface of the other land, leſt any moiſture ſhould lodge. No ſtraw is neceſſary to lie under the potatoes. If the ſtratum under the ſoil be rock, the rock is not proper for covering.

farmer in the Queen's County, in Ireland. As this man is a very intelligent perſon, and particularly as he worked under his father in the farming buſineſs the earlier part of his life, it appears to me that his information is worthy of communication.

He told me, in the phraſe of his country, that potatoes, “whether on their parent-bed, or in the pit in which they are preſerved, after being dug up, by being uncovered, *take the wind*, and become unwholeſome for food to *man*, as they cauſe ſickneſs, and greatly diſorder the body.” He told me, at the ſame time, that his father, after picking out the largeſt of theſe potatoes, from the ſurface of the field or the mouth of the pit, for ſeed (for which they were as ſerviceable as any other) gave always the refuſe to the pigs, and that, to them, they were not an unwholeſome food.

The fact of their being unwholeſome to man ſhould be enquired into moſt certainly in the firſt place, at a time when, on account of the ſcarcity of bread, the poor are glad of any offal they can get at; and when, what they will think good food, is likely to preſent itſelf to them by the ſide of every footpath. Probably ſome hundred thouſands of people in England will this year, for the firſt time, be familiarized with potatoes; and many of the farmers who cultivate them, know as little about them as their hinds. I wiſh, therefore, moſt ardently that the Board of Agriculture would proſecute this enquiry without loſs of time; that, if it ſhould be thought neceſſary, there may be inſerted in the paper promiſed by them for general circulation, a caution with reſpect to roots of my deſcription, viz. “Roots lying on, or immediately under the ſurface of the ground, of a different colour from thoſe in the ſame plantation, which lie at a greater depth.” Should it turn out, as I am ſatisfied it will, that theſe roots are unwholeſome to *man*, and yet that they may be given to ſome ſorts of cattle without danger, the farmer will not be diſcouraged by this caution: and ſhould it be proved that the roots of this deſcription are as proper as any other *for ſeed*, there will be added much to the maſs of food for the conſumer, as almoſt all the wholeſome produce of the crop may then be ſpared for the exigencies of the time, without depriving the grower of the means of having a crop of the ſame ſort of potatoe the following year, ſhould he have found that of this year beneficial. It appears to me, that the moſt ignorant grower of potatoes may give material information to the Board upon ſome of theſe points. For example, the owners of the great plantations of potatoes on the Eſſex road, a few miles from town, may be aſked, What they do with potatoes of that deſcription? The ſame queſtion may be aſked of different potatoe-growers in Lancaſhire. I have worked myſelf up to be really alarmed at the proſpect of danger from this cauſe, if not attended to in time; and that muſt be my excuſe for again troubling you upon this ſubject. But to you *nihil phyſici, nihil humani, alienum eſt.* Adieu.

DEAR SIR,

Yours moſt faithfully,

Wing, March 23, 1795. H. J. DE SALIS.

No. X.

Robert Beatſon, Eſq. of Kilrie, in Fifeſhire, reſpecting ſome Experiments on Potatoes, April 3, 1795.

SOME years ago I tried an experiment; after which I always planted my own potatoes whole. I took one of the largeſt potatoes I could get, and planted it whole in my garden without dung, the produce was ſeventy-two potatoes in all; above twenty of them were nearly as large as the mother-plant, the remainder of different ſizes, gradually decreaſing to about the ſize of a walnut. Next ſeaſon I planted the whole of that produce alſo uncut, ſetting the largeſt in the front row, the next largeſt in the ſecond, and ſo on, diminiſhing the ſize in every row till the laſt, which was the ſmalleſt of all. By this experiment I found not only that the ſtems of the largeſt ſeed were by far the ſtrongeſt, but their produce was alſo by far the greateſt, none of them producing potatoes larger than their reſpective ſeed. From this it would appear that the larger the ſeed-potatoe, the larger will be the produce. Whether the original potatoe would have produced an equal weight, had it been cut in three or four ſets, I cannot ſay; but unleſs it would have produced a great deal more, the advantages are certainly in favour of ſetting them whole, by ſaving a great deal of labour and occupying a leſs ſpace of ground. The largeſt potatoes are often found neareſt the ſurface.—Quere, If theſe were taken away without hurting the ſtems, about five or ſix weeks before the others are taken up, whether the ſmaller ones would not grow to a much larger ſize, and the produce be greatly increaſed? I was ſhewn a potatoe at Ormſkirk, of the ſort called there the Golden Dab, which meaſured nine inches and a quarter long, eight inches broad, and two feet in circumference; its weight four pounds and an half, averdupois. The clergyman who ſhowed it to me ſaid, that the perſon from whom he got it, had another one, of the ſame kind, a pound heavier.

I have the honour to be, with the greateſt reſpect and eſteem,

SIR,

Your moſt obedient and moſt faithful humble ſervant,

Kilrie, April 3, 1795.

R. BEATSON.

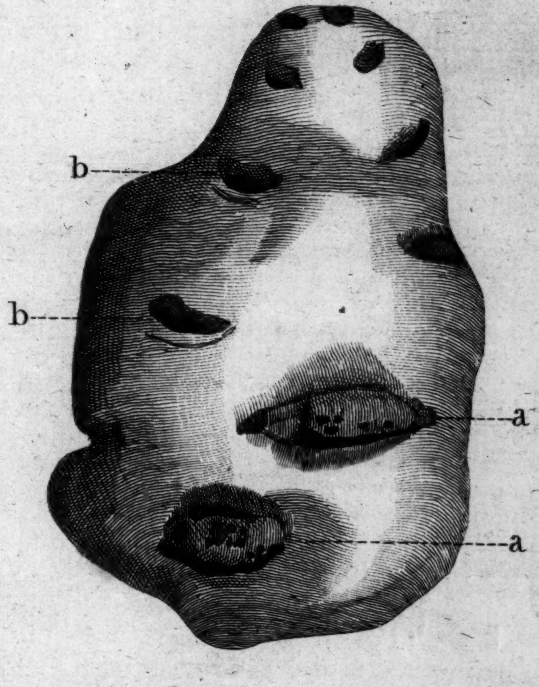
No. XI.

To Arthur Young, Eſq.

SIR,

YESTERDAY, when in company with Sir John Sinclair, I happened occaſionally to mention an obſervation reſpecting potatoes, which was made by ſome farmers. Sir John was immediately to leave town, but deſired me to communicate the obſervations to you: it is reſpecting the eye of the potatoe. It was obſerved, that in almoſt every potatoe there were two kinds of eyes, the one prolific, the other not. The former was always ſunk deep in the potatoe, and produced a ſtrong vigorous ſhoot that, in favourable circumſtances, had a fair chance to have a good crop. The latter did not ſink ſo deep, and always had a little ſwelling or protuberance in the middle; from which protuberance a few weak ſhoots ſprung forth, that, even in favourable circumſtances, had but a ſcanty crop in compariſon of the other. I have not had an opportunity of putting the obſervation to the trial, although I have ſome doubts about the truth of it, yet I think it merits attention. I have incloſed a draught of a potatoe with both kinds of eyes; a a, the unprolific; b b, the prolific kind.

In agriculture every remark, whether true or falſe, that is made by farmers ſhould be attended to: fair experiments ſhould be made, and the truth



See Report on Potatoes P. 166.

Neele Sculp^{t} 352, Strand

B L

aſcertained. By this means error will be detected, and uſeful improvements promoted. I remain,

SIR,

Your obedient and humble ſervant,

Edinburgh, April 30, 1795.

DAVID URE.

No. XII.

To Arthur Young, Eſq.

SIR,

AT Trowbridge-Houſe, near Crediton, Devon, in November, an heifer calf was fallen, and attempted to be reared by the ſkim milk, after the cream had been taken off by the Devonſhire hot dairy proceſs. In a ſhort time the calf, as might have been expected, was ſeized with the ſhoot,* and reduced to a ſkeleton; on which I ordered the dairy-maid to boil up about a large table-ſpoonful of potatoe-ſtarch in each meal, which brought it to the conſiſtence of middling cream: in a few days the ſymptom of the ſhoot diſappeared, and as the calf began to thrive, the mixture was continued as a diet until the winter (which was not a remarkable mild one) was over, when it took to eating graſs; at ſix months it had caught the calves of the preceding ſpring in point of ſize; at one year old it was far beyond them; and at two years old (on my leaving the country) was ſold for more than any cow I had.

Yours, &c. &c.

THOMAS WILLIAM STURGEON.

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* The Flux.

No. XIII.

To the Preſident of the Board.

SIR,

I HAD the honour of receiving your letter of the 11th inſtant, which I delayed anſwering till I ſhould make ſome enquiry about the mode of raiſing potatoes from cuts or ſlips taken from the ſtems, as the fact had not come under my own obſervation.

It ſeems to be well known among the gardeners here, and in other counties, that potatoes may be raiſed from ſlips or ſide-branches of the ſtems, cut or tore off from under-ground and planted; but the crop had in this way, is late and unproductive, the deficiency being far more than equal to the ſaving of ſeed; ſo that this mode of raiſing potatoes in the county is not practiſed as matter of utility, but curioſity.

I had heard that a great proportion of the kind of potatoe raiſed by the gentlemen of this county, had been propagated from a few brought to it by David Hume, the hiſtorian.

SIR,

Your moſt obedient and very humble ſervant,

ALEX. LOW.

No. XIV.

Incloſed to the Preſident of the Board.

SIR,

HAVING noticed you frequently to throw out occaſional hints for the advancement of agriculture, and particularly that the planting of potatoes might be continued during all the month of April, I am induced to addreſs you, leſt perſons not converſant in the culture of that incomparable vegetable food, might infer the inefficacy of planting at a later period of the ſeaſon. Speaking from experience, I would ſeldom chuſe to plant before the firſt of May, if the intention were to raiſe a full mature crop for preſerving over the winter, as in the field culture; for by a more early planting there would be ſome riſk of injury by froſt, the plant being remarkably tender in its firſt vegetation. But I have planted, with a conſiderable degree of ſucceſs, as late as the beginning of July; and the moſt abundant crop I ever experienced was planted on the eighth; and three or four ſucceſſive days in June, to full twenty tons per acre.

I have ſaid thus much at this time of ſuppoſed or real ſcarcity, perſuading myſelf of your willingneſs to circulate ſuch obſervations as tend in any ſort to remove a complaint of ſo ſerious a nature.

I am,

SIR,

Your obedient ſervant,

Briſtol, May 24, 1795. NEHEMIAH BARTLEY.

No. XV.

ON peruſal of the anſwers publiſhed in the Annals of Agriculture to a circular letter of the Editor's, the writer of this was particularly ſtricken with the account given of the conſumption of wheat in two families (ſee Annals, page 223, No. 136); in which is related, That a family of nine eat five buſhels and a half in four weeks; and that another family of ſeven perſons, eat five buſhels in four weeks. Now, ſuppoſing the buſhel Wincheſter, and the weight 57 lbs. each buſhel (according to the act) the conſumption was in the family of nine, lbs. 8.708 each perſon per week; and in the family of ſeven, lbs. 10.178 each perſon per week.

From facts of ſuch important national concern, at this particular juncture, ſome further data well aſcertained may afford many uſeful hints to the political arithmetician; and for which purpoſe the following have been collected by the kind aſſiſtance of two neighbours.

No. 1. A family of fourteen, have each conſumed lbs. 5.75, taken on an average of the laſt ſeven weeks.

No. 2. A family of ten people (four of whom are children) have each conſumed lbs. 5.337, on an average of the laſt twenty weeks.

No. 3. A family of forty have each conſumed lbs. 6.5625 of wheat each perſon, on an average of the laſt twelve weeks. The conſumption of the laſt family exceeding the other two may be eaſily explained, by the latter having regularly and daily either dumplings or puddings under ſome form, and which are reckoned to make a greater ſhare of the meal than the uſual application of ſuch articles. It may be further neceſſary to ſtate, that from every twenty-three buſhels (of 70lbs. weight) the uſual quantity ground at one time by family No. 3, there is taken out of bran 240lbs. from the whole quantity. The loſs of the mill is always reckoned 1½ lb. at every 70lbs, or 34½lbs. in the whole twenty-three buſhels. No bread from the baker, &c. is purchaſed in this family.

The uſe intended to be made by the preſent writer (a further inveſtigation being left to abler pens) from theſe ſtatements, betwixt the difference of conſumption in a northern and ſouthern county *(a)*, and the exceſs of the latter, will be an endeavour to account for theſe extraordinary facts: and what cauſe more probable than the general uſe of the potatoe in Lancaſhire, ſince many people never eat bread along with their meat together with the potatoe; and ſince the potatoe proves ſuch a ſaving of bread in its boiled ſtate, and a further ſaving when mixed up with flour and made up into the loaf, of what a national conſequence becomes a more extenſive cultivation and more general introduction!

To render this ſubject ſomewhat clearer, the three families have endeavoured to render a juſt eſtimate of the conſumption of the potatoe in each family; and from which computation appears the following reſult:

No. 1. Fourteen conſume lbs. 9.45 each perſon weekly. N. B. There is generally an overplus in this family, which is given to the poultry or pigs.

No. 2. Ten conſume (not aſcertained) each weekly.

No. 3. Forty conſume 6½lbs. each weekly, at the preſent ſeaſon; becauſe when other vegetables, peaſe, beans, &c. are in ſeaſon, the conſumption of the potatoe is leſs. But between the family of ſeven, in the ſouth, and the family of forty in the north, there is a ſaving of nearly 4lbs. of wheat per head per week, or 160lbs. in the forty in family per week. The value of which will be nearly as follows:

		£.	s.	d.
260lbs. potatoes, value	— —	0	7	0
160lbs. wheat, present price, value	—	1	7	0
Balance, or ſaving		£. 1	0	0

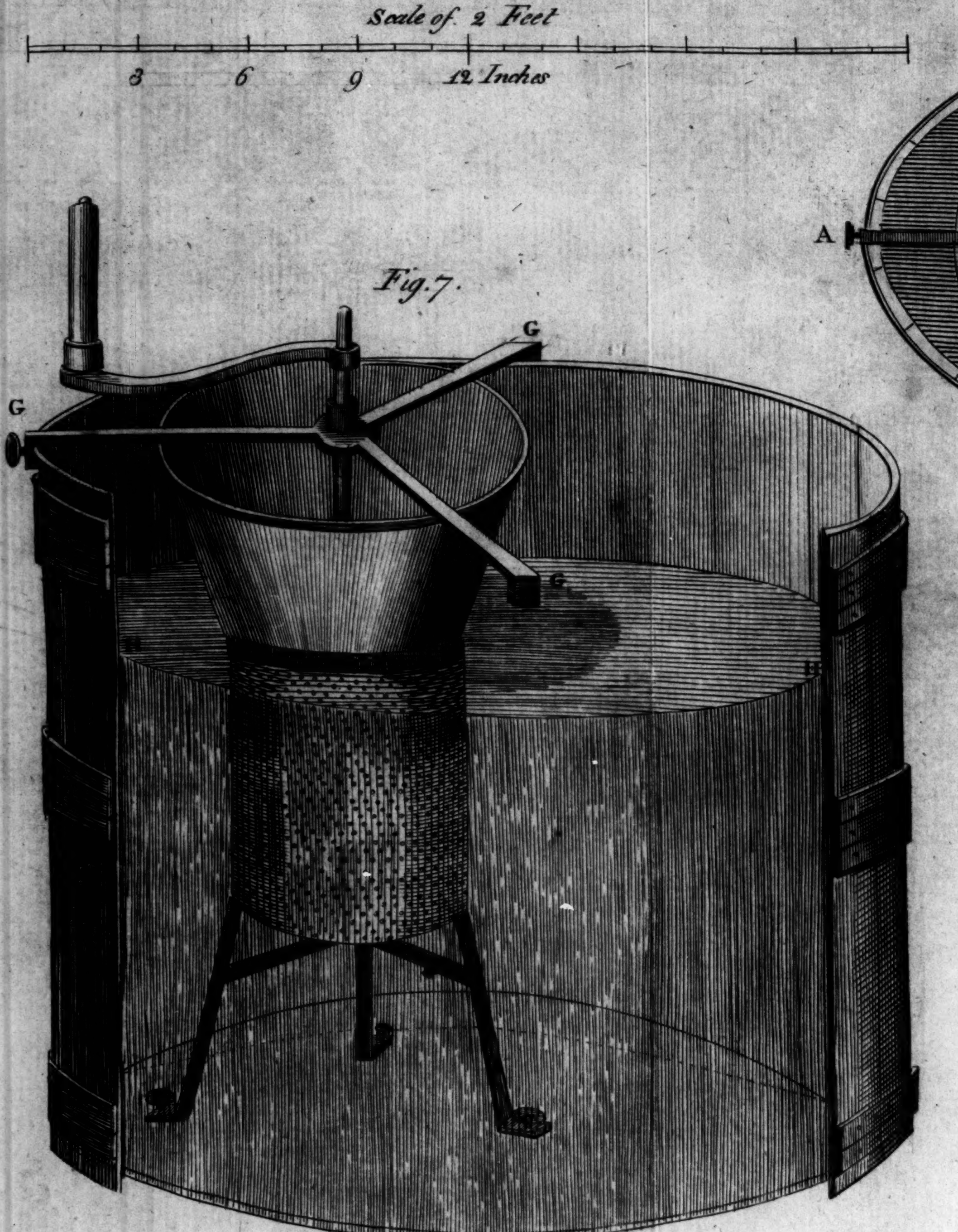
How greatly may this calculation be extended, when we take into the account that the potatoe affords two meals every day to many families of the labouring claſs, and that without the leaſt bread! Nay, there are many families in the northern counties who never eat bread, but what is conſumed at tea!

Walton, May 15, 1795. **JOHN HOLT.**

(a) Hampſhire.

PLATE to REPRESENT the WORKI

Fig. 7.



WORKING of the POTATOE MILL.

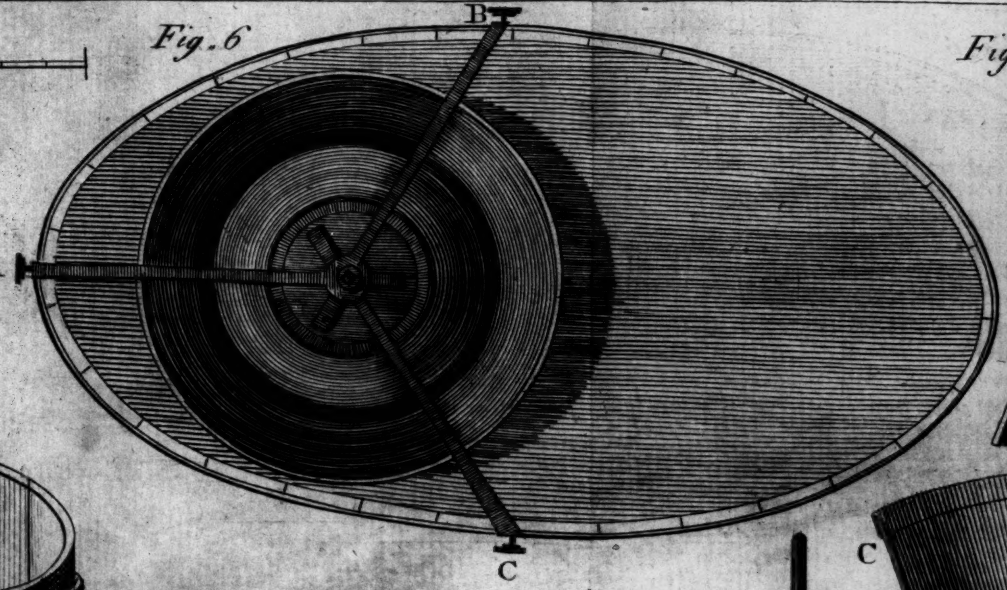


Fig. 6

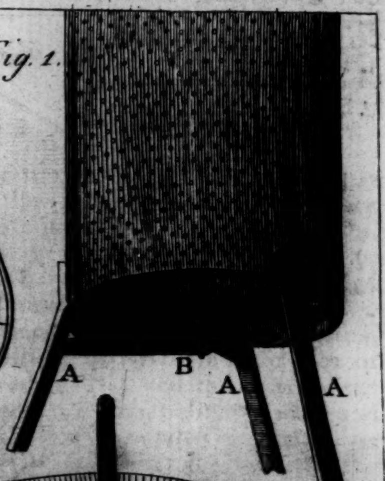


Fig. 1.

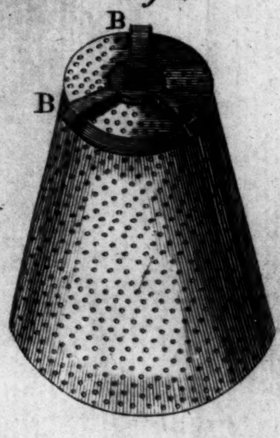


Fig. 2.

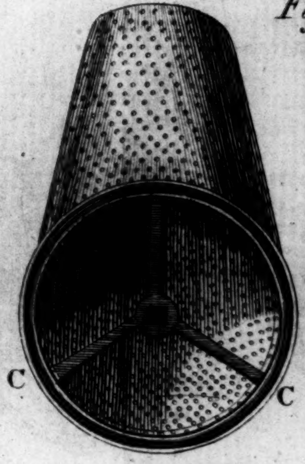


Fig. 3.

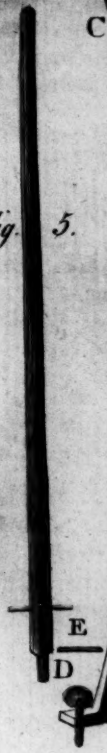


Fig. 5.

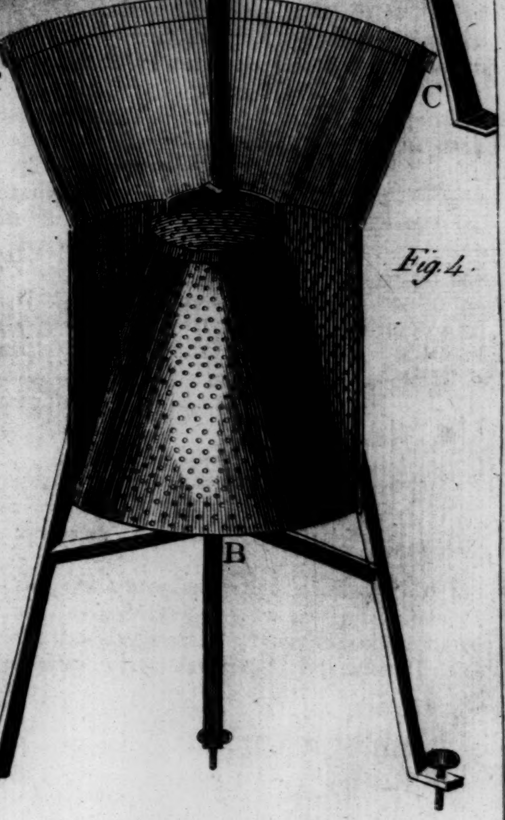


Fig. 4.

No. XVI.

To the Preſident of the Board.

HONOURABLE SIR,

I WISH to inform you, that there is a huſbandman at Asfield, in this Dale (*a*), who diſcovers a genius for Agriculture. Laſt year he raiſed two crops of potatoes from the ſame ſeed; the laſt crop was as big as a crab-apple. The two crops were raiſed in ſeventeen weeks, of an exceeding good quality, and anſwer well either for ſeed or eating. He has ſold great quantities of potatoes for ſeed near one hundred miles round this place. If a ſecond crop can be raiſed in ſo cold and barren a part, I think a warmer climate would produce much more.

May 7, 1795. JOHN HILL.

No. XVII.

Mill for Raſping Potatoes; and the Method of obtaining therefrom Starch or Flour

By Mr. BEAUMÉ.

Tranſlated from the Memoirs of the Royal Academy of Sciences of Paris, March 4, 1786.

OF all the machines which have been invented for comminuting potatoes with the leaſt inconvenience, and collecting flour therefrom, it has been found that the common raſp held in one hand, while with the other the potatoes were rubbed thereon, was the moſt ſimple, and contributed moſt to enable the potatoe to yield its flour, and in the greateſt quantity; but ſuch an implement, excellent as it may be, ſo far only affords a tedious and inconvenient method, as the roots can only be raſped one after another,

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(*a*) John Milner, Asfield, in Ravenstendale, Weſtmoreland.

and the perſon expoſed to hurt his fingers. But the advantages reſulting from the raſp, ſuggeſted to me the idea of introducing it, in the conſtruction of a mill; of which I now give the deſcription.

I got a raſp made with Swediſh ſheet iron, to which I gave a cylindric form (Fig. 1.) about ſeven inches diameter, and about eight inches high; the perforations from the holes are inwards. This raſp is ſupported by three feet (AAA) made of flatted iron, ſeven inches high, and ſolidly fixed to the raſp by nails rivetted thereon. The lower end of each foot is elbowed out about an inch, with a hole bored through to receive a ſcrew. (See the feet of the mill, Fig. 4.) One inch below the upper extremity of the tripod, there is fixed at B (Fig. 1 and 4.) a three-branched prong of flatted iron, rivetted together, to keep the three feet firmly at their proper diſtances: the centre of this prong is perforated with a ſquare aperture, to ſerve as the point of reſt to a wooden or iron axle-tree; of which we ſhall ſpeak preſently. To the upper part of the cylindric raſp is added a kind of hopper (CC, Fig. 4.) of ſheet iron, about ten inches diameter, and five inches high. In the inſide of the cylindrical raſp, a ſecond raſp is fixed, but of a conic form (Fig. 2 and 3.) the point of which is truncated: this raſp ſhould be of ſtrong ſheet iron, and the projection of the apertures are to be outwards. This cone is placed with its baſe downwards, as may be ſeen (Fig. 4.): at the upper part of the cone a ſmall triangular ſtar, or prong of three branches, is rivetted at B B B (Fig. 2.) of flat iron. In the middle, a ſquare aperture is made to receive a wooden or iron axle-tree; but to give greater reſiſtance to this part of the cone, it is ſtrengthened by an iron cap fixed on the raſp and rivetted with nails, and likewiſe bored with a ſquare hole for the axis to paſs through.

Fig. 3. repreſents the ſame cone ſeen in front; the baſe (CCC) is alſo furniſhed with a ſtar of three branches, rivetted by three points to an iron hoop, placed at the lower part of the inſide of the cone. The centre of this ſtar is alſo pierced with a ſquare hole for the paſſage of the axis.

Fig. 5. is the axle-tree; it is an iron bar ſixteen inches long, about ſeven inches ſquare, round at the bottom, and alſo round at top, where it correſponds with the ſtar GGG (Fig. 7.) in order to turn on its two points of reſt; and it is made ſquare at the upper end to receive a handle about nine inches long, with which the conic raſp is turned. At D (Fig. 5.) a ſmall hole is made to receive a ſmall raſp E, in order to fix the conic raſp on a level with the cylindric raſp.

Fig. 6. is a wooden veſſel, in the ſhape of a bathing-tub, wherein the mill is fixed, and repreſented with a bird's eye view. ABC is an iron ſtar of three branches, and ſcrewed on the tub. The centre of this ſtar is pierced with a round hole, to form the centre of gravity for the axis when in motion.

Fig. 7. repreſents the mill when placed at one end of the tub, that the other part of the tub may be free, and leaving room to do any thing that may be wanted. One ſide of the tub is repreſented as if taken off, to have a better view of the inſide, and ſhow how the mill is to be placed. In order not to weaken the bottom of the tub by the holes occaſioned by ſcrews, a falſe bottom made of deal boards is placed under the feet of the mill, about one inch thick, and the feet of the mill are ſcrewed thereon. When the mill is ſet to work, it is fixed at the bottom of the tub in the manner juſt mentioned. The upper part is made ſteady by means of the triangular prong G G G, ſcrewed down (Fig. 7.); the tub is then filled with water as high as H H; the hopper is filled with potatoes well waſhed and cut into ſlices, as we ſhall ſhew preſently. The handle I, is then turned round (Fig. 7.) The potatoes, crumbled between the two raſps, are forced out by degrees at the bottom, by means of the water in the tub.

Strict proportions are not required in the conſtruction of ſuch a mill. But to indicate thoſe which experience has taught me to be good ones, a ſcale is added to the plate, to which the workman may have recourſe. With this mill 100lbs. of potatoes may be raſped in a couple of hours.

Method of preparing the Starch, or the Flour of Potatoes.

TO obtain the flour of potatoes, take any quantity deſired of theſe roots, ſteep them in a tub of water for about an hour, then cleanſe them of their fibres and excreſcences; rub them one by one with a hardiſh bruſh, to clear them of any earthy particles remaining in their ſinuous parts, then waſh them ſeparately, and put them into another tub of clean water. When the quantity deſired is thus prepared, cut thoſe potatoes that are too large into ſlices about the bigneſs of an egg, and then throw them into the mill fixed in the tub of water. A man turns the handle of the mill. In proportion as they are raſped they fall to the bottom of the mill. From time to time the pulp which collects itſelf muſt be ſcooped away with a wooden ſpoon, when it is ſeparated and thrown into water.

When all the potatoes are thus ground, all the pulp is collected together in one tub, and diluted in a conſiderable portion of clean water; then another tub is provided, taking care that it is very clean, on the rims of which, two deal laths are fixed traverſewiſe, in order to ſupport a horſe-hair ſieve, of rather an open texture; the water with the pulp is poured on the ſieve; the flour is forced through by the water; the pulp remains on the ſieve; water is poured on repeatedly, till it runs in the ſtate in which it is poured. The pulp remaining on the ſieve is thrown away as uſeleſs: and thus the whole quantity of raſped potatoes are diſpoſed of.

The liquor which has paſſed through the ſieve is of a duſky colour, and muddy: in proportion to the extractive ſubſtance which it contains diſſolvable, it depoſits in the courſe of five or ſix hours all the flour which it kept back. When the depoſit is formed, the water is racked off as uſeleſs; a conſiderable quantity of freſh water is then poured on the flour remaining. The flour is left to ſteep, in order to cleanſe it; and it is left in this ſtate till the next day. A ſimilar depoſit of flour is obſerved; the water is racked off as uſeleſs. The flour is again diluted with a freſh ſupply of water, and the mixture is paſſed through a ſilken ſieve, rather of a cloſe texture. The ſmall quantity of *parenchyma* which had paſſed with the flour through the horſe-hair ſive now remains on the ſilken ſieve. The water is left in a ſtate of reſt till the flour is well reunited: if the water floating above it appears perfectly clear, without the leaſt colour or flavour, then the proceſs is completed; but while the leaſt flavour or tinge remains in the water, another waſhing muſt be performed, until the ſmalleſt particle of the extractive ſubſtance is obtained.

When the flour is ſufficiently laved or waſhed, it is taken from the tub with a wooden ladle, and placed upon hurdles of reeds, covered previouſly with paper, that the flour may dry and be ſcreened from duſt: when it is ſufficiently dry, it is paſſed through a ſilken ſieve to clear it of any impurity remaining; after which, it is laid by in glaſs veſſels, merely covered with paper.

REMARKS.

The major part of the potatoe-flour prepared for ſale contains ſome particles of ſand, perceived when between the teeth: this proceeds from careleſſneſs in the waſhings. It is not an eaſy matter to clear away the ſand lying in the knots and folds of the root. The mode of cleaning theſe roots, though apparently ſimple, requires nevertheleſs much care and attention: the ſame may be ſaid of preſerving the whiteneſs of the flour. The *fecula* is perfectly white; if it is wiſhed to obtain it ſo, it muſt be ſeparated with care by ſufficient waſhings from all extractive matter. This muſt be done in ſweet and clean veſſels, that will not communicate any diſagreeable flavour: earthen-ware would be the beſt; but that is impracticable on a large ſcale: wooden tubs become unavoidable: deal is preferable to oak; which latter is apt to communicate ſome tinge, if the extractive matter has not been exhauſted by being long and often in water.

The mill, being fixed in a tub of water, never becomes choaked; but as the raſped potatoes ſoon form a maſs at bottom, it is proper to remove them from time to time, to prevent them from being choaked. The pulp may be waſhed as often as it preſents itſelf; it is then placed on the horſe-hair ſieve as faſt as they get it, and water is poured on ſufficiently, to force the flour through: what remains on the ſieve is the pulpous *parenchyma* of the root, deprived of the *fecula*, of which we are ſpeaking. This matter is very nutritive, may be boiled in water, and cattle fed with it. It is an object of conſequence worthy of ſome attention, particularly when it is performed on a large ſcale, becauſe about ſeven-eighths of this matter remains, which ſhould not be loſt.

The firſt ſeparation of the pulp, by the horſe-hair ſieve, is very handy to get rid ſpeedily of a large quantity of the pulp: if a little paſſes through the ſieve, it forms its depoſit in the laſt inſtance on the ſurface of the flour, and gives it a dirty tinge: but this need not give any uneaſineſs, as, being of a more groſs nature than the flour, it is eaſily ſeparated therefrom, by means of the ſilken ſieve above mentioned.

SORTS.

In Berwickſhire, ſome gardeners raiſe potatoes from ſlips, or ſide-branches of the ſtems, cut or tore off from under ground, and planted; but the crop had in this way is late and unproductive, and is practiſed as a matter of curioſity rather than of real uſe. *MS. Papers of the Board.*

In the ſame ſhire, an excellent ſort known under the name of *The Spaniſh Potatoe*, which ſeems to be near akin to the beſt Kidney, was introduced from a few given by the Spaniſh Ambaſſador to David Hume, the celebrated hiſtorian, and ſent by him to his friends in Scotland. They came originally, it is ſaid, from the Spaniſh Main. *MS. Papers of the Board.*

Uſe when frozen.

As the froſt affects only the water in the potatoes, and not at all the ſtarch, the latter may equally be extracted, and will be found as white and good as if not frozen *(a)*, provided they are not quite deſtroyed.

(a) Parmentier Traité de Pommes de Terre, p. 292.

EXPERIMENTS FROM DR. HUNTER'S GEORGICAL ESSAYS.

On Tranſplanting Potatoe-Tops. By Mr. Elleray, near Mancheſter.

On the 18th of May, 1772, finding ſome beds I had ſown very early with onions to be a miſſing crop, I was induced to make the following experiment: The year before, I had ſet ſome potatoes in another part of my garden, in the common way; and as it is impoſſible but ſome will remain in the ground all winter, ſo I found a number of ſprouts, about three inches high, which I nipped off cloſe to the ground, and tranſplanted them into the onion-beds, without any farther preparation, about a foot and a half aſunder, in the ſame manner that cabbages and cauliflowers are planted. As the ſeaſon became immediately very dry, I was obliged to give my plants a little water for four or five ſucceſſive nights; after which they began to flouriſh, and had the appearance of a promiſing crop during all the ſummer. At the uſual time, in October, I ordered them to be taken up; and for ſize, quantity, and quality, they exceeded all I ever had in the common way. Had the ground been freſh, properly manured and prepared, and the plants put down at a proper diſtance from each other, I am of opinion that the ſucceſs would have been ſtill greater.

On Baking or Kiln-drying Potatoes, and feeding Hogs with them.

By Mr. Charles Chaloner.

From an accurate experiment made laſt year, I dare venture to recommend baked potatoes as an excellent food for hogs. The pork produced by this food, was equal to that from barley and beans; but at preſent I cannot exactly aſcertain the comparative experiment with regard to expence: however, I am of opinion that roaſted potatoes, conſidering the improvement of the hogs, is as cheap a food, if not cheaper, than can be given them. I roaſt my potatoes upon a kiln, ſimilar to what is uſed by oatmeal-ſhellers for drying their oats. The difference in expence between boiling and roaſting the potatoes is prodigious, both with regard to the labour and fuel. A kiln that will coſt 3l. will roaſt potatoes ſufficient for the maintenance of more than 20 hogs; and one man will beſtow all the neceſſary attendance upon them, and do other work beſides. The action of the fire, by diſſipating the crude juices that are contained in raw potatoes, reduces them into a ſtate highly wholeſome and nutritious. Boiling does this in part, but not ſo effectually. A potatoe roaſted in the manner above deſcribed, partakes much of the nature of a cheſnut, and perhaps is not greatly inferior to it.

On Extracting Spirits from Potatoes.

Several experiments have been made in Scotland for extracting ſpirits from potatoes; but no deciſive evidence of the poſſibility of doing it has as yet been tranſmitted to the Board. It may be proper, however, here to inſert an experiment for that purpoſe, mentioned in the Swediſh Tranſactions. Sixteen meaſures of potatoes were boiled with water and worked with the liquor till the whole became a tough dough. This was diluted with boiling water to the conſiſtence of thin gruel, and fermented. The fermentation went on well; and the liquor diſtilled on the third day, yielded one meaſure of good brandy. The potatoes did not ſettle or burn to the ſtill, as might have been ſuſpected.

The author, Mr. Skylte, makes a compariſon from this experiment, of the profits in cultivating potatoes and barley for the purpoſes of diſtillation. He computes that the produce of ſpirit from potatoes, is to that from barley, in equal extents of ground, as 566 to 156, even admitting the potatoes to be planted in the worſt kind of grounds, and the barley in ſo good a ſoil as to yield an increaſe of fiftyfold (*a*).

It certainly is not deſireable to make ſo pernicious an article as ſpirits too cheap: at the ſame time, conſidering the ſcarcity of grain all over Europe, the diſcovery of any ſubſtitute that would anſwer for diſtillation, in place of barley and other grains, is a matter of conſiderable importance. It was therefore thought adviſeable to take notice of the above experiment in this Report.

FINIS.

(*a*) See Neumann's Chemical Works, tranſlated by William Lewis, M. B. &c. vol. 2. p. 258.

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